IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

LG DISPLAY CO., LTD., Plaintiff, v. CHI MEI OPTOELECTRONICS CORPORATION, et al. Defendants.	Civil Action No. 06-726 (JJF) Civil Action No. 07-357 (JJF) **CONSOLIDATED CASES**

OPENING CLAIM CONSTRUCTION BRIEF OF PLAINTIFF LG DISPLAY CO., LTD.

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NATURE AND STAGE OF THE PROCEEDINGS

These proceedings involve three related patent infringement cases concerning 23 patents. LG Display Co., Ltd. ("LGD") brought the first-filed case (C.A. 06-726) in this District. AU Optronics Corporation ("AUO") and Chi Mei Optoelectronics Corporation ("CMO") responded by filing suits in Wisconsin ("AUO Action") and Texas ("CMO Action") against both LGD and its affiliate LG Display America, Inc. ("LGD America"). Both cases have since been transferred here for consolidation.

LGD is alleging that AUO and CMO infringe nine patents (the "LGD Patents"). AUO is asserting eight patents (the "AUO patents") against LGD and LGD America. CMO is asserting six patents (the "CMO Patents") against LGD and LGD America. The parties have identified claim terms for claim construction briefing and filed their Joint Claim Construction Statement. (D.I. 376, Exs. A through W.)

SUMMARY OF ARGUMENT

LGD's proposed constructions are provided in the Joint Statement and are addressed in the Argument section for each patent. Given the large number of terms in dispute, LGD has only addressed the key terms in this brief. LGD's proposed constructions and intrinsic support for all disputed terms, however, are set forth in exhibits accompanying this brief. In addition to those terms in dispute for which LGD proposes a construction, there are also a number of terms which LGD contends are indefinite, as identified in the Joint Claim Construction Chart. D.I. 376 at Ex. K-2, 6; Ex. L-1-4; Ex. M-13, 15; Ex. R-2; Ex. S-2, 6; Ex. V-4, 5.[1] References in this brief to an

[1] Ex. L-1 (LGD '002 Patent); Ex. L-3 (LGD '737 Patent); Ex. L-5 (LGD '449 Patent); Ex. L-7 (LGD '274 Patent); Ex. L-9 (LGD '321 Patent); Ex. L-10 (LGD '489 Patent); Ex. L-11 (LGD '569 Patent); Ex. L-12 (LGD '374 Patent); Ex. L-14 (LGD '984 Patent); Ex. L-16 (AUO '069 Patent); Ex. L-17 (AUO '781 Patent); Ex. L-18 (AUO '157 Patent); Ex. L-20 (AUO '629

(Footnote cont'd on next page.)

LGD Patent, AUO Patent, or CMO Patent are made to Joint Exhibit 1 ("JX 1"), by which the parties are jointly submitting copies of the patents-in-suit. Similarly, references herein to the prosecution histories of an LGD Patent, AUO Patent, or CMO Patent are made to Joint Exhibit 2 ("JX 2"), by which the parties are submitting copies of the cited documents from within the U.S. prosecution histories for the patents in suit. For the Court's reference, complete copies of the prosecution history for each patent in suit (which in several cases exceed a thousand pages in length) are being jointly submitted to Chambers on compact disk.

BACKGROUND FACTS

Liquid crystal display (LCD) technology is widespread, from watches and calculators to large screen televisions and monitors. LCD technology has evolved and improved significantly from the days of its first application in watches and calculators to today's flat screen televisions and monitors, but its basic technology has not changed. Today's LCD displays include features shared with the earliest designs, including an LCD panel, driver circuitry, and backlight unit. At the same time, additional features have improved LCD displays, such as compensation films that allow a wide viewing angle. LCD manufacturing technology has also evolved along with improvement in image quality of LCD displays.

An LCD panel includes a liquid crystal ("LC") layer between two substrates: a color filter ("CF") substrate and a thin film transistor ("TFT") substrate. The CF substrate includes three

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(Footnote cont'd from previous page.)

Patent); Ex. L-22 (AUO '266 Patent); Ex. L-23 (AUO '944 Patent); Ex. L-24 (AUO '160 Patent); Ex. L-25 (AUO '506 Patent); Ex. L-26 (CMO '926 Patent); Ex. L-28 (CMO '092 Patent); Ex. L-30 (CMO '923 Patent); Ex. L-32 (CMO '352 Patent); Ex. L-33 (CMO '786 Patent); Ex. L-34 (CMO '179 Patent).

color filters to provide color images on the LCD display, and the TFT substrate includes thin film transistors, each dedicated to control a pixel of the display. TFTs are manufactured directly on the substrates using semiconductor manufacturing technology, which has steadily improved over the last 25 years. For example, the ability to form the TFTs in a vacuum chamber without exposure to oxygen has improved the performance of the TFTs. Also, the number of steps used to make a TFT has decreased steadily, reducing the cost of manufacturing a TFT and thereby decreasing the ultimate cost to consumers.

The transistor itself has also improved. By using a dual metal structure for the gate electrode, including aluminum on the bottom and molybdenum on top, the overall transistor is less prone to failure which could damage a pixel. The reduction of parasitic capacitance and misalignment between the gate and drain of the TFT has improved pixel flickering, image retention, and gray scale non-uniformity. Moreover, the ability to protect TFTs from electrostatic discharge (ESD) that inevitably occur during manufacturing has increased yield rates to again lower cost. The circuitry that forms an ESD guard ring to protect the TFTs is now crucial to making LCD products. In some instances, additional patterns (called "dummy patterns") made of conductive elements are formed on the TFT substrate to provide a non-electrical function to assist in the manufacturing process.

When the two substrates are each complete, they are assembled together. For decades, the two substrates were assembled with a gap between them to accommodate a liquid crystal layer, which was subsequently injected into the gap through a hole using vacuum. This cell gap was maintained using "spacers" made of round polymers spread onto one of the substrates prior to assembly. Prior to the increase in screen size to over 15 inches and beyond, the liquid crystal injection method was acceptable, but due to the time needed to uniformly fill the gap using

vacuum, this method became impractical for producing large screen displays. Thus, the industry needed to develop "one drop fill" (ODF) technology for mass production where the liquid crystal layer is first applied onto one of the substrates before the two substrates were assembled. This dramatically decreased the time needed to fill the cell gap with liquid crystal and paved the way for large screen LCD displays to become a commercial reality.

To utilize the ODF technology, column spacers or pillars replaced round or ball spacers. The column spacers, using the same or similar materials as the ball spacers, were now formed at strategic locations on one of the substrates instead of spreading already manufactured "balls" onto the substrate. Moreover, the sealing material had to be applied consistent with the ODF technology onto one of the substrates to assemble and seal the two substrates together with no holes since post-assembly liquid crystal injection was not required. To further reduce manufacturing cost, a technology was also developed to use a single manufacturing line to process both the CF and TFT substrates instead of using dedicated lines, one for each substrate.

Once the LCD panel is formed, driver circuitry is attached at specific locations. The driver circuitry including gate or scan drivers and source or data drivers applies appropriate signals to the individual TFTs to operate each pixel of the display. When the signals are applied, the liquid crystal molecules are moved in desired directions according to the signals to display the images. The driver circuitry may also compensate for inherent material characteristics using techniques such as overdrive and gamma correction.

The overdrive technique has been around for decades and refers to applying a voltage initially at a level higher than the desired voltage in an attempt to quickly reach the desired voltage. This allows the liquid crystal molecules to physically move faster to ultimately prevent blurring of images when there is fast action. For example, in a baseball game, LCD televisions

were not able to clearly show the ball flying across the screen because the liquid crystal molecules were not able to move fast enough, i.e., the liquid crystal response time was slow. The overdrive technique reduces liquid crystal response time to improve video images.

Gamma correction refers to the need to compensate for the nonlinear relationship between video signal voltage and light intensity needed to display an image. Because of the nonlinear relationship and differing responses for different colors (*e.g.*, red, green and blue), the driver circuitry is designed to modify the incoming video signal to display an image with color correction.

The LCD panel with the appropriate driver circuitry is assembled with a backlight unit (BLU). The backlight unit simply shines light through the LCD panel as controlled by the liquid crystal molecules. The BLU includes various components, including a light source such as florescent tubes and light emitting diodes; light distributing structures such as reflectors, diffusers and light guides; and a housing.

ARGUMENT

I. CLAIM CONSTRUCTION PRINCIPLES

Claim construction is a question of law. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977-78 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370, 388-90 (1996). In interpreting a claim, a court should look first to the intrinsic evidence, *i.e.* the patent itself, including the claims and the rest of the specification, and, if in evidence, the prosecution history. *Vitronics Corp. v. Concebtronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). Although it is within the sound discretion of a court to use extrinsic evidence as an aid in construing a claim, extrinsic evidence is "unlikely to result in a reliable interpretation of patent claim scope unless considered in the

context of the intrinsic evidence." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1319 (Fed. Cir. 2005) (en banc).

A claim term should be construed to mean "what one of ordinary skill in the art at the time of the invention would have understood the term to mean." *Markman*, 52 F.3d at 986. However, "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips*, 415 F.3d at 1313. Thus, the specification is usually "dispositive; it is the single best guide to the meaning of a disputed term." *Id.* at 1315 (quoting *Vitronics*, 90 F.3d at 1582). In other words, a claim term can be given its correct construction only within the context of "what the inventors actually invented and intended to envelop with the claim." *Phillips*, 415 F.3d at 1316.

A claim is indefinite only if it is "not amenable to construction" or is "insolubly ambiguous." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005). A term is not "indefinite" simply because it is difficult to construe. If the term can be given a reasonable, even if reasonably debatable, meaning, it is not indefinite. *Id.* at 1347; *see also Union Pac. Res. Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692 (Fed. Cir. 2001) (providing that the definiteness inquiry "focuses on whether those skilled in the art would understand the scope of the claim when the claim is read in light of the rest of the specification").

II. PROPOSED CONSTRUCTION OF CLAIM TERMS OF THE LGD PATENTS

A. U.S. Patent No. 5,019,002 –the "ESD Protection" patent

The '002 patent is directed to protecting flat panel displays from electrostatic discharge ("ESD") during their manufacture and subsequent use. 2:45-51. Electrostatic discharge occurs when there is a transfer of electrostatic charge between two objects, the stress of which can

permanently damage sensitive electronic components. An electrostatic discharge between the row and column lines of a TFT array may render one or more transistors, and the corresponding pixels, inoperative. 2:57-62; 4:46-60. These display defects, arising from ESD, can radically decrease production yields and correspondingly increase the manufacturing cost per unit. 2:11-42, 4:46-60. In order to protect against ESD, the '002 patent discloses a method of providing a conductive path (in the form of one or more electrostatic discharge guard rings), which serves to disperse charge. 2:45-68.

The '002 patent was previously litigated by LGD in this Court, in a case titled *LG.Philips LCD Co., Ltd. v. Chunghwa Picture Tubes Ltd., et al.*, C.A. No. 05-292-JJF. The Court provided its claim construction for the '002 patent on June 13, 2006 (Ex. L-2 (a)), and the case proceeded to trial in July 2006. At trial, however, the parties disagreed regarding how to apply the Court's construction of two important terms, namely "interconnecting" and "resistance." Notably, these two terms are again at issue. In an effort to resolve potential ambiguities, and thereby facilitate trial of the '002 patent, LGD proposes clarifications of the Court's prior constructions for these two terms.

1. *"interconnecting substantially all of said row and column lines to one another and substantially all of said column lines to one another"* (claim 1)

At the heart of the parties' disputed constructions are the questions of *how* the lines are to be interconnected (by what material), *how many* lines are to be interconnected (whether "substantially all" includes "all"), and in *what manner* the lines are to be interconnected.

a. ***"interconnecting"***

This Court previously construed the term "interconnecting" to mean "electrically connecting with conductors." Ex. L-2(a) at 1. Subsequently, at trial in 2006, the defendants

argued that the term "conductors" should be read narrowly, limited to certain *types* of materials, such as metal. LGD, however, argued that the term should be understood in a manner conducive to the operation of the claimed invention and, therefore, includes conductive material. LGD seeks to clarify this ambiguity. As CMO was not a party to the previous case, it may not have been aware of the ambiguity and simply proposed the earlier construction without clarification.

There is no basis to limit the construction of "interconnecting" to only certain types of conductive materials. The specification provides that the purpose of the '002 invention is to protect the array by providing a "conductive path" for dispersal of electrostatic charge. 2:45-68. Neither the patent nor its prosecution history contemplate that the type of conductive material would be limited, *e.g.*, to metal rather than including semiconductor. Indeed, a semiconductor may be used effectively to provide the "interconnection" claimed in the '002 patent. JX 2 ('002 Pros. Hist.) (March 31, 1989 Office Action; U.S. Patent No. 4,803,536 (Tuan) Fig. 5(a); 4:45-57; 5:30-34). LGD's proposed construction, "electrically connecting with conductive material," is consistent with the claim language, the specification, and its prosecution history.

b. ***"substantially all"***

Each of the parties agree that "substantially all" does not *require all*. The dispute is whether "substantially all" *permits all*. One of skill in the art would recognize that it does. A purpose in the '002 patent is preventing damage caused by ESD. One approach would be to connect all the row/column lines. One of skill in the art would recognize, however, that dummy row or column lines may exist at the periphery of the display area that may not necessarily be interconnected. Thus, the claim language "substantially all" covers both situations. As such, LGD proposes the term means "all or nearly all."

AUO and CMO, conversely, propose that "substantially all" precludes all. CMO proposes "nearly all, but not all," and AUO proposes "almost all." *See* D.I. 376 at B-3. In the '002 patent, the "Summary of the Invention" states that it intends to "provide[ ] improved methods of manufacturing backplanes and the resulting flat panel displays to increase the manufacturing yield, decrease manufacturing costs and substantially eliminate fatal display defects caused by electrostatic discharge during manufacture and thereafter." 2:45-51. AUO's and CMO's constructions conflict with the '002 patent, because connecting all or nearly all achieves this stated goal. Furthermore, taken logically, if all row/column lines are connected, then certainly at least nearly all are also connected. To exclude the situation where all are connected needs a clear disavowal of scope, which is not present. *See generally Ventana Med. Sys., Inc. v. Biogenex Labs.*, 473 F.3d 1173, 1180-82 (Fed. Cir. 2007). Defendants' constructions should be rejected.

c. ***"to one another"***

Another portion of the disputed term is "to one another." This relates to *the manner* in which the row and column lines must be interconnected. In view of the disclosure in the '002 patent, LGD proposes this means connecting "to at least one other." LGD's proposed construction contemplates that the guard rings (both inner and outer) described by the patent may be implemented in a variety of ways, whether to provide partial, complete, or even coextensive protection. Figure 4 of the patent, for example, depicts connected pairs of row and column lines, as being interconnected. Fig 4; 5:65-68; 6:4-9. Similarly, the patent observes that "[m]odification and variation of the present invention are possible" and "[t]he ESD guard rings can be utilized separately or together. . . ." 5:49-50; 55-57. Consequently, the '002 patent discloses electrically connecting each row/column line to at least one other row/column line.

CMO's proposed construction does not appear to address this issue, leaving potential ambiguity. AUO, however, proposed that almost all of the row/column lines must be connected together -- supposedly into a single group of row or column lines. This interpretation is not required by the claims nor even disclosed in the patent. In fact, contradictory interconnections are disclosed. Fig. 4; 2:29-36; 5:65-68; 6:6-9; *see also* Ex. L-2(c) (U.S. Pat. 4,820,222) at Fig. 7; 7:40-42. Each of defendants' proposed constructions should be rejected; and LGD's proposed construction for the entire disputed phrase as "electrically connecting with conductive material all or nearly all row lines to at least one other row line and electrically connecting with conductive material all or nearly all of the column lines to at least one other column line" should be adopted.

2. *"resistance"* (claim 1)

The second term at issue during the July 2006 trial was "resistance" and whether it required the term to be limited to a resistor. LGD agrees with this Court's prior claim construction opinion that recognized the term "resistance" is not so limited. Ex. L-2(b) at 10-13. In an effort to remove any ambiguity, LGD proposes that resistance means "a circuit component designed to provide opposition to electric current flowing through itself and to minimize current surge in the TFT array from electrostatic discharge." This Court previously construed "resistance" to mean "a circuit component that has a specified resistance to the flow of electric current and is used to minimize the current surge from electrostatic discharge." Ex. L-2(a) LGD's proposed construction slightly modifies this Court's prior construction by replacing the term "resistance" in the construction with its understood meaning, namely "the opposition offered by a body or substance to the passage through it of a steady electric current." Ex. L-2(d)

(Merriam-Webster Dictionary (1980)). Additionally, LGD clarified that the current surge must be minimized *in the TFT array*, to be consistent with the claims and specification.

CMO's proposed construction appears to adopt this Court's prior construction without reconciling the earlier ambiguity at trial. AUO's proposed construction for "resistance," conversely, attempts to limit resistance to resistor by requiring "a specified ratio between voltage and the flow of electric current." D.I. 376 at B-8. The Court previously rejected such a construction, noting that "[defendant's] proposed construction unnecessarily limits "resistance" to one specific electrical component, a resistor. There is no support in the intrinsic record for such a narrow interpretation." L-2(b) at 11. Consequently, defendants' proposed constructions should be rejected.

3. ***"outer electrostatic discharge guard ring"*** **and** ***"removing said outerguard ring and row can column interconnections"*** **(claim 1)**

The terms "outer electrostatic discharge guard ring" and "removing said outer electrostatic discharge guard ring and row and column interconnections" have also been previously addressed by this Court. Ex. L-2(a) (June 13, 2006 Order) at 1-2. These constructions were not an issue during the July 2006 trial. LGD proposes that the Court adopt the previous constructions of "outer electrostatic discharge guard ring" (which the Court defined as "a closed or open ring, or open L or C-shaped line, outside the active matrix display to provide protection from electrostatic discharge") and "removing said outer guard ring and row and column intersections" (which the Court defined as "physically disconnecting said guard ring and row and column interconnections"). *Id.* These constructions provide clear meaning of the disputed terms in the context of the claims and specification and therefore should be adopted.

AUO contends that the term "removing said interconnection prior to completion of the display" is indefinite.[2] D.I. 376 at 10. LGD notes, however, that this term did not present any ambiguity or confusion at the prior trial of the '002 patent. Further, CMO joins LGD in proposing that the Court adopt its prior construction of these terms.

B. U.S. Patent No. 4,624,737 –the "Improved TFT" patent

The '737 patent was previously litigated in *LG.Philips LCD Co., Ltd. v. Tatung Co. of America, et al.*, Case No. CV 02-6775 CBM (JTLx), C.D. Cal. ("the CPT California litigation"), where the Court addressed a number of terms in dispute here. Defendants identified approximately 40 terms as requiring construction, many of which were already construed. LGD asserts that this Court adopt constructions of the California Court, as shown in Ex. L-4(a), (b), which includes that Court's constructions.

The '737 patent was fundamental to the development of liquid crystal displays. Prior to this invention, a masking step was performed before the deposition of the n+ amorphous silicon film which resulted in natural oxide forming on the exposed surface of the amorphous silicon creating an electrical resistance between the source and drain that impaired the performance of the transistor. 1:41-44. The '737 invention was directed to, *inter alia*, preventing the formation of natural oxide by continuously depositing the gate insulating layer, the amorphous silicone layer, and the conducting film (containing at least a low resistivity semiconductor layer) without exposing them to an oxidizing atmosphere. 2:20-23; 3:53-56. By removing the masking step after the amorphous silicon layer, and not exposing the films to an oxidizing atmosphere, no

[2] Defendants asserted several other terms are indefinite. LGD contends these terms would readily be understood by one of skill in the art as set forth in its proposed constructions previously submitted to the Court. D.I. 376 at Ex. B.

oxide is formed thus improving the contact and performance of the thin film transistor. 3:52-57, 4:10-12. Further, this method of manufacturing thin film transistors reduced the number of mask steps and associated manufacturing costs. 4:3-6.

1. *"oxidizing atmosphere"* (claim 1)

This Court should adopt the construction of the California Court for oxidizing atmosphere: "an atmosphere that would create a detectable amount of oxidation on a film." Ex. L-4(a) at 9. The specification sets forth that the invention requires preventing exposure to an atmosphere that forms a natural oxide giving rise to an electrical resistance between the films. 1:41-44. One of skill would thus understand that small or insignificant amounts of oxidizing agents, or an atmosphere that would not impair the electrical characteristics of a thin film transistor, would not be an "oxidizing atmosphere." Indeed, the California Court noted that a "*de minimus* amount of oxidation is not an 'oxidation atmosphere.'" *Id.* Defendants' proposed constructions ignore the teachings of the specifications and the California Court's construction.

2. *"forming…on"*/ *"depositing on said gate electrode and substrate"*/ *"depositing on"* (claim 1)

LGD asserts that this Court should adopt the California Court's construction of "forming…on" as "giving form or shape to…above and supported by or in contact with." Ex. L-4(a) at 14. The claim language and the specifications mandate that "on" refers to "above and supported by *or* in contact with." Claim 1 recites:

> continuously depositing *on* said gate electrode and substrate *a gate insulating film, a high-resistivity semiconductor film, and a conducting film* containing at least a low resisitivity semiconductor film

(emphasis added). The claim recites depositing three layers *on* the gate electrode and substrate. In addition, as shown in Figs. 2b and 3b of the specifications, the first gate insulating film would be the only film that is in contact with the gate electrode and the substrate. The remaining two

films, the high-resistivity semiconductor film and conducting film containing at least a low-resistivity semiconductor film, are not in contact with but are above and supported by the gate electrode and substrate. Similarly, claim 1 requires:

> a third step in which said high-resistivity semiconductor film and said conducting film are selectively etched so that they are partly left as an island region *on* said gate electrode,

(emphasis added). As described above, the semiconductor layer is deposited on the gate insulating film. Consequently, the semiconductor layer does not contact the gate electrode. Defendants' proposed construction contradicts each of the embodiments. Figs. 2a-2e, 3a-3d.

Furthermore, Defendants' construction is meritless because other elements of the claim specifically use the term "contacting," for example "a source electrode and a drain electrode both contacting part…." Thus, "on" should not be construed to require "contacting".

AUO also proposes that "forming" should be construed as "producing." D.I. 376 at A-3. This assertion provides no guidance to the meaning of the term and is unnecessary. One of skill in the art would understand the meaning "of forming" is "to give form or shape to" which should be adopted.

3. ***"serving as at least part of a mask"/"said source and drain electrode serving as at least part of a mask"/"mask"*** **(claim 1)**

LGD asserts that this Court adopt a slightly modified version of the California Court's construction to be "serving as *at least* a part of the pattern above a surface from which material is to be selectively removed, where the pattern is made of material that is resistive to the removal technique relative to the material to be removed." Ex. L-4(a) at 13. The addition of the words "at least" to the Court's construction mirrors the claim language and should resolve an ambiguity that arose during trial in California.

Defendants argue that the electrodes must be "on the top surface" or "partially define the

boundary," essentially asserting, as CPT had argued in the CPT California litigation, that the electrodes must be the outermost layer. *Id.* at 12-13. Order re Claim Construction, May 5, 2005, at 12. Specifically rejecting this argument, the California Court stated that "[w]hile the photoresist may be the outermost layer of the mask, the electrodes are part of the mask structure, as they, too, are resistive to the removal technique and in the pattern needed to etch exposed conductive film." *Id.* Furthermore, Defendants' construction disregards the plain understanding one of ordinary skill would have of the claim language. The claim only requires that the source and drain electrode be "at least a part of a mask" with no further limitations. Defendants are clearly attempting to read improper limitations -- of being the outermost layer and defining the boundaries -- into the claim. To the contrary, and as held by the California Court, the source and drain electrode must only be a part of the mask, not the outermost layer.

4. "*selectively removing*" / "*selectively removing said conducting film exposed on said island region*" (claim 1)

LGD proposes the California Court's construction for "selectively removing" as "removing selected regions only" be adopted, and such construction should also apply to the larger phrase. Ex. L-4(a) at 14-15. CMO again improperly tries to import limitations into a term that is contrary to the claim language and the specifications. CMO asserts that the "*entire* conducting film in the space between the edges of the source and drain electrode" must be etched. D.I. 376 at A-17-18. This importation is unsupported, unwarranted and contrary to the clear meaning of the claim language which states "selectively" removing not removing entirely. Nowhere does the intrinsic evidence support CMO's erroneous importation.

5. "*continuously depositing*" / "*depositing*" (claim 1)

LGD and CMO both propose that this Court adopt the California Court's construction for "continuously depositing" as "the formation of the gate insulating film, the high-resistivity

semiconductor film and the conducting film without intervening films." D.I. 376 at A-5. AUO's argument that depositing should be limited to "chemically precipitating" or "precipitating" is without any basis. The specification describes a number of process methods, for example, plasma CVD, sputtering, photo CVD, molecular beam, or ion beam deposition. Nowhere does it suggest that depositing should be limited to chemically precipitating. 4:13-24.

C. U.S. Patent No. 5,825,449 –the "Substrate Wiring Design" patent

Similar to the '737 patent, claim terms in the '449 patent have already been construed by the Court in the CPT California litigation. Defendants have identified almost 50 terms as requiring construction, many of which were already construed. The terms with the Court's previous constructions are submitted in Exhibits L-6(a), (b).

The '449 patent is directed to wiring structures in liquid crystal display devices wherein TFT arrays require hundreds of wiring connections. As discussed in the patent, insufficient insulation between layers, such as between the pixel electrode and the source/drain layer, can result in shorts or opens in the wiring that can cause processing errors fatal to the display. An additional concern is minimizing costs in the design and manufacture of these TFT arrays, for example by reducing the number of mask manufacturing steps to fabricate an array. Thus, the goal of the patent is not only to ensure proper wiring connections throughout the array but to do so in a cost effective manner.

1. *"one of said first and second conductive layers" / "one"* (claim 1)

The disagreement here is the meaning of the word "one". LGD contends the construction should be "one, but not both, of the first and second conductive layers," as construed by the California Court, while Defendants ask this Court to disagree with that Court and hold that one means "one or more". D.I. 376 at C-8. Defendants' construction obviously fails in view of the

plain and ordinary meaning of "one", the intrinsic evidence, and sound principles of claim construction.

Claims terms are generally construed to have their ordinary and customary meaning as understood by one of skill in the art. Here, the word "one" is a commonly understood word with a well-known and widely accepted meaning -- a single unit. Ex. L-6(c) (Merriam-Webster (1994)). Nowhere do the claims, specification or intrinsic evidence suggest that this plain and ordinary meaning should not apply here, nor is there any basis for this Court to construe "one" to have a different meaning.

The claim language demonstates "one" must mean only one for the claim to make sense:

> wherein one of said first and second conductive layers is connected to one of a plurality of terminals of a thin film transistor.

6:17-19. Notably, the claim limitation twice uses the term one, first referring to the conductive layers and then referring to the plurality of terminals. Thus, if "one" meant "one or more," as asserted by Defendants, the claim would allow for both the first and second conductive layers to be connected to each and every terminal of a thin film transistor, resulting in an unusable device.

Any attempt by Defendants to argue that one should include more than one to cover the embodiment shown in Fig. 5 would be meritless as such argument has already been specifically rejected by the court in the CPT California litigation. As explained in that court's order, claim 1 was amended to include the disputed term to overcome the rejection based on U.S. Patent No. 5,162,933 to Kakuda:

> In the instant case, patentee LG Electronics specifically disavowed an interpretation of the claim that provided for either, or both - in other words, "one or more" - of the conductive layers being connected to a terminal of a thin film transistor;…"

Ex. L-6(e) at 2.

Likewise, any argument by Defendants that the introductory phrase "comprising" permits inclusion of more than one would be meritless. The Federal Circuit has held that even when comprising introduces the claim, it "does not free the claim from its own limitations." *Spectrum Int'l, Inc. v. Sterilite Corp.*, 164 F.3d 1372, 1379-80 (Fed. Cir. 1998). When, as here, a numerical limitation on the structural elements is clear from the language of the claim, the claim is so limited and cannot include more. *See Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1271 (Fed. Cir. 1986) (holding that a claim reciting a transitional phrase "which comprises" does not expand the scope of the recited "eight cube pieces").

2. "*connected to*" (claim 1)

LGD proposes that connected to should be defined as "directly connected to." This construction is consistent with its use in the claims. Nevertheless, AUO incorrectly argues that "connected to" should mean "electrically connecting," ignoring that electrically connect is another term identified to be construed. D.I. 376 at C-8. Thus, AUO's attempt to argue that there is no difference in the terms *connected to* and *to electrically connect* is fundamentally flawed.

The use of different terms in the claims gives rise to a presumption of different meanings. Here, the claims clearly distinguish between the use of connect and electrically connect. For example, comparing claim 1 to the embodiment of figure 3, the claim refers to the conductive layer 7 "connecting directly" to a terminal of the thin film transistor, while "electrically connecting" the second conductive layer, the source pad 2A, to the first conductive layer 7 through a third ITO layer 6C. Thus, the claims demonstrate that connected to refers to directly connecting with the same material while electrically connecting is providing an electrical conduction path, potentially through more than one layer.

Further, AUO's proposed construction that "connected to" means "electrically connected to" is inconsistent with the language in Claim 1:

> said indium tin oxide layer extends through said first and second contact holes *to electrically connect said first conductive layer with said second conductive layer*, and wherein one of said first and second conductive layers is *connected to* one of a plurality of terminals of a thin film transistor.

6:13-19 (emphasis added). The claim clearly requires that *one of* and *not both* of the conductive layers connect to a terminal of a thin film transistor. Moreover, as the first and second layers are already electrically connected to each other, the last element would essentially mean that by connecting one conductive layer to a terminal of thin film transistor, *both* the first and second layer would be connected to a terminal of a thin film transistor, rendering the *one of* claim language meaningless. AUO's proposed construction therefore cannot be correct.

3. "*conductive layer*" (claims 1, 10, and 11)

A conductive layer should be construed as "a thickness of electrically conductive material," as agreed to by the parties in the CPT California litigation. Ex. L-6(b) at 96. By its proposed definition, CMO suggests that the conductive layer of claim 1 refers to the entire layer of a conductive material that may include multiple patterned structures. D.I. at C-2. This argument is contrary to the plain meaning in claim 1 and cannot be applied consistently throughout the claims.

For example, claim 10 requires a first conductive layer including different structures, such as a gate pad and source pad, while claim 1 does not. Claim 1 refers to a portion of the entire layer by only requiring "a first conductive layer formed on a first portion of the substrate" and "a second conductive layer formed on a first portion of said insulative layer." In addition, as described in the specification, thin film transistors generally are made of two conductive layers, with intervening semiconductor and insulative layers. If the conductive layer in claim 1 refers to

the entire conductive layer, the first and second layers would both be necessarily connected to the terminals of the thin film transistors. Thus, CMO's construction cannot be applied to the conductive layer in claim 1.

The specification also supports that "conductive layer" can be limited to only one portion of an entire layer. For example, in describing Fig. 3, the specification states:

> Thus, after patterning, a *first transparent conductive layer 6C* connects source electrode 7 with source pad 2A, and a *second transparent conductive layer 6* (i.e. the pixel electrode) is connected to drain electrode 8.

4:61-64. While different structures were made of the same transparent conductive layer, the specification refers to each separate structure with the term conductive layer.

4. *"gate pad" / "source pad"* (claims 10 and 11)

LGD asserts the constructions of gate and source pads should be "a portion of patterned electrically conductive material that is provided near the periphery of the thin film transistor array to receive a gate signal" and "a portion of patterned, electrically conductive material that is provided near the periphery of the thin film transistor array to receive a data signal."

LGD's construction varies from the California Court's construction to precisely describe the signal type received by the pad that subsequently controls operation of a TFT. Generally, gate and source pads are bonding pads for connecting to external circuitry. For example, bonding pads are defined as "metal pads arranged on a semiconductor chip (usually around the edge) to which wires may be bonded so that electrical connection can be made to the component(s) or circuit(s) on the chip…" Ex. L-6(d) (Penguin Dictionary of Electronics, 3rd ed. 1998)). Therefore, LGD's proposed construction should be adopted.

D. U.S. Patent No. 5,905,274 –"Single Photoresist Hillock Protection" patent

U.S. Patent No. 5,905,274 (and related patents 6,815,321, and 7,176,489) discloses the

dual purpose of protecting against the development of hillock and maintaining adequate coverage of a gate insulating layer. Aluminum (or other metals with a low resistivity) that are generally used for the gate of flat panel display experience thermal stresses under high temperatures causing hillock, or blisters on the surface of the metal. The blisters result in the gate insulating layer having thin areas that can eventually cause the gate insulator to breakdown causing a short.

The '274 patent provides for a range in the difference in width between two layers of the gate to prevent hillock and avoid deficient gate insulator coverage. As noted in the '274 patent background, when the width difference was 4 p.m. or greater, hillock would not be prevented. Conversely, when the difference was too small, the gate insulator coverage would be compromised. Accordingly, the '274 patent discloses that when the difference of width between the first and second layers is greater than 1 • m and less than 4 • m, hillock will be prevented and there will be smooth coverage by the gate insulating layer.

The '274 patent also describes that two photoresists were used in the etching process of the gate metal layers requiring complex processing and resulting in increased contact resistance between the layers. 2:60-65. To address this issue, the '274 patent is directed to a single etching process where the first and second metal layer are sequentially deposited and etched with a single photoresist.

1. *"the first metal layer being wider than the second metal layer by about 1 to 4 µm"* (claims 1 and 4)

LGD asserts that "being wider" refers to the entire width of the first metal layer. The claims, specification, intrinsic record, and understanding by one of skill in the art mandates that it must. Accordingly, the proper construction is "the width of the first metal layer, determined by the portion of the first metal layer in contact with the second metal layer together with the portions exposed to the subsequently deposited gate insulating layer, is more than 1µm and less

than 4μm greater than the width of the second metal layer."

This construction is consistent with the context of the claims which also requires that hillock is prevented at the sides of the first metal layer. The specification explains that the invention is directed to hillock *at the sides* of the first metal layer. 5:34-37; 2:55-60; 3:21-26; 6:40-48. Similarly, the specification identifies the relevant portion as the "side portions of the first metal layer 43 having no second metal layer 45 thereon." 5:22-23; 6:40-42. One of ordinary skill would understand the limitation includes the entire portions where hillock can occur, *i.e.*, where the first metal layer is exposed to the deposited gate insulating layer.

Likewise, the specification provides that the width of the first metal layer is the same as the width of the photoresist. 1:53-58; 6:3-6; 6:20-21; Fig. 4A. One of ordinary skill would understand that according to standard etching techniques, the first metal layer could not end up being wider than the photoresist. Cited prior art, for example U.S. 5,156,986, confirms this. *See* JX F-1. U.S. 5,156,986 to Wei at Figures 2-4. The prosecution history of the '610 patent, a divisional of the '274 patent, also supports LGD's proposed construction. In the August 3, 2001 response, the applicant describes that Wei, GB 2253742, discloses the first and second metal layer having the same width. *See* Ex. L-8(a).

In order to prevent hillock, the exposed portions where the first metal layer containing aluminum contacts a subsequently deposited insulating layer is important. This is supported by arguments made during prosecution, where the applicant distinguished the Miyago reference as teaching a clad structure and an oxide layer. Thus, the claims cover a subsequently deposited gate insulating layer, but not when the metal layers are covered by a clad structure or oxide layer.

Another aspect of the construction LGD seeks to clarify is that the range is limited to between 1 • m and 4 • m, exclusive of these values. Here, the specification *only* refers to the

range exclusive of 1 • m and 4 • m, and there is no contrary discussion in either the prosecution history or the claims. Further, the background of the invention specifically states that the difference in width *equal to 4 • m* was known in the art and would have issues with hillock formation. Accordingly, the range must be construed to exclude 1 • m and 4 • m to be consistent with the specification.

Only LGD's proposed construction addresses these issues as set forth in the claims, taught in the specification and explained during prosecution of the '274 patent application.

2. *"double-layered structure"* (claims 1 and 4)

The underlying dispute is whether the gate includes two metal layers or has only two metal layers. Consistent with the claim language "a gate including a double-layered structure," LGD asserts that the proper definition is "a structure of an electrically conductive material that includes two sequentially deposited metal layers." D.I. 376 at F-2. CMO, however, disregards the word "including" and attempts to limit the term to only two layers. Including is an open ended term and permits the inclusion of additional features, such as additional layers. Further, nothing in the intrinsic evidence suggests that the structure should be limited to only two layers.

The prosecution history supports that the invention can include additional layers. For example, the Office Action dated August 20, 1998 cites U.S. Pat. No. 5,036,370 to Miyago as a double layered structure. Ex. JX F-1 (8/20/1998, Office Action). Miyago includes two metal layers with a third metal layer forming a clad structure covering both layers. In the response, the applicant stated that Miyago was a double layered structure and distinguished the reference on other grounds. JX F-1 (11/23/1998, Amendment).

Finally, AUO's attempt to import an unclear requirement, a "step structure," into the claim term impermissibly reads limitations into the claims and disregards the technical

disclosures in the specification regarding etching.

3. *"a second metal layer disposed on the first metal layer"* (claims 1 and 4)

LGD's proposed construction of "sequentially depositing the second metal layer above and in contact with the first metal layer" is in accordance with the claims and specifications. For example, the summary of the invention supports that one purpose is to "reduce the contact resistance between the first and second metal layers constituting a gate." 3:30-33. Further, the summary of the invention describes depositing a first metal layer *on* a substrate but depositing the second metal layer *directly on* the first metal layer.

E. U.S. Patent No. 6,815,321 –"Single Photoresist Hillock Protection" patent

U.S. Patent No. 6,815,321 is a divisional patent in the family of the '274 patent discussed above. Thus, LGD proposes that the same constructions apply to similar terms identified below.

1. *"a total width of the first metal layer is greater than a total width of the second metal layer by about 1 to 4 µm"* (claim 7) and *"the first metal layer being etched to have a width greater than a width of the second metal layer by about 1 to 4 • m"* (claim 16)

LGD proposes that these terms have consistent constructions with the first metal layer being wider than the second metal layer by about 1 to 4 µm discussed regarding the '274 patent such that they mean "the width of the first metal layer, determined by the portion of the first metal layer in contact with the second metal layer together with the portions exposed to the subsequently deposited gate insulating layer, is more than 1µm and less than 4µm greater than the width of the second metal layer."

2. *"double layered metal gate"* (claim 7)

LGD proposes that this term has a similar construction as the double-layered structure discussed regarding the '274 patent such that it means "a patterned structure of an electrically conductive material that includes two sequentially deposited metal layers and includes a portion

that controls current flow through the channel between the source electrode and drain electrode."

3. *"forming a second metal layer on the first metal layer"* (claim 7) *and "depositing a second metal layer on the first metal layer"* (claim 16)

LGD proposes that these terms have similar constructions to a second metal layer disposed on the first metal layer discussed regarding the '274 patent such that they mean "sequentially depositing the second metal layer above and in contact with the first metal layer."

4. *"waking"* (claim 16)

A review of the claims, specification and prosecution history reveals that the word "waking" was a clerical error by the Patent Office. The application, as originally filed, and all responses consistently use the word making. JX G-1 ('321 Patent Pros. Hist.) at 111. Accordingly, Defendants' assertion that the term is indefinite is unwarranted.

5. *"first etching layer"* (claim 10)

A review of the claims, specification and prosecution history reveals that the term "first etching layer" was a clerical error. As claim 10 is dependant on claim 7, which only discloses a first metal layer, the record is clear that first etching layer should be "first metal layer." Accordingly, Defendants' assertion that the term is indefinite is unwarranted.

F. U.S. Patent No. 7,176,489 – "Single Photoresist Hillock Protection" patent

U.S. Patent No. 7,176,489 is a divisional patent in the family of the '274 patent discussed above. Accordingly, LGD proposes that the same or similar constructions apply to comparable terms as identified below.

1. *"a total width of the first metal layer being greater than a total width of the second metal layer by about 1 to 4 • m"* (claim 1)

LGD proposes that this term has the same construction as the first metal layer being wider than the second metal layer by about 1 to 4 μm discussed regarding the '274 patent such

that it means "the width of the first metal layer, determined by the portion of the first metal layer in contact with the second metal layer together with the portions exposed to the subsequently deposited gate insulating layer, is more than 1μm and less than 4μm greater than the width of the second metal layer."

2. *"double layered metal gate"* (claim 1)

LGD proposes that this term has a similar construction as the double-layered structure discussed regarding the '274 patent such that it means "a patterned structure of an electrically conductive material that includes two sequentially deposited metal layers and includes a portion that controls current flow through the channel between the source electrode and drain electrode."

3. *"having a first metal layer and a second metal layer thereon"* (claim 1)

LGD proposes that this term has a similar construction to a second metal layer disposed on the first metal layer discussed regarding the '274 patent such that it means "sequentially depositing the second metal layer above and in contact with the first metal layer."

G. U.S. Patent No. 6,664,569 – the "Improved Picture Quality" patent

The '569 patent is directed to providing an array substrate for use in an LCD device that has a novel structure for reducing parasitic capacitance and misalignment between the gate and drain electrodes which causes pixel flickering, image retention, and gray scale non-uniformity. 2:59-62; 3:6-8; 4:6-9. Parasitic capacitance is proportional to the overlapping area, such that as the overlapping area of gate-drain or gate-source increases, the parasitic capacitance also increases. Further, as misalignment frequently occurs between the gate and drain layers, this can vary the parasitic capacitance significantly from one product to the next. The specification describes how even a change of 1 μm in the overlapped region can cause a 25% variation in parasitic capacitance. 3:8-22. Parasitic capacitance can thus cause serious issues with the

picture quality of a display. 3:25-29.

1. *"having an opening therein"* (claims 17 and 25)

The proper construction is "has a space in its pattern to reduce gate-drain capacitance and compensate for gate-drain layer misalignment." The specification defines the opening in terms of reducing the parasitic capacitance and compensating for layer misalignment and by the overlap relationship between an opening in the gate electrode and the drain electrode explaining how it achieves these goals. 4:6-11; 8:65-9:6; 5:65-6:16. The specification describes that the overlap between the gate and drain is minimized by the opening to reduce the parasitic capacitance. 6:13-17. The specification also describes that the design of the overlap between the opening and the drain electrode is to compensate for misalignment. Fig. 8; 8:50-62.

Although the specification provides exemplary shapes of openings in two embodiments -- an inverted T shape and a rectangle shape -- the claimed invention should not be limited to only those structural shapes. Thus, LGD's proposed construction properly reads the claim term in light of the specifications, but without importing the structural examples of the preferred embodiments into the claims which would be contrary to well-established principles of claim construction.

AUO's proposed construction, which would limit the opening to the narrow structures described in the embodiments of the specifications, violates sound claim construction principles and is contradicted by the specification itself which states "a portion of the gate electrode is patterned so as to form a certain-shaped opening." 8:65-66. In other words, while the specification identifies that the opening must have a specific shape that would reduce parasitic capacitance and compensate for misalignment, it is not limited to the structural limitations asserted by AUO. Accordingly, LGD asserts that the Court should adopt its construction.

2. *"the opening includes a first opening portion and a second opening portion"* (claim 25)

Consistent with the previous term's construction, LGD proposes this term means "the space in the gate electrode pattern includes a first part to primarily compensate for gate-drain layer misalignment and a second part to primarily reduce gate-drain capacitance." In reading the claims in light of the specification, one of ordinary skill would understand that the primary purpose of one portion of the opening is to compensate for misalignment. As shown in Figure 8 of the '569 patent, the inner portion of the opening compensates for any misalignment because only the edges of the drain electrode overlap. 8:44-46. Further, Figure 8 shows and the specification describes a second portion of the opening being wider than the drain electrode such that none of the gate electrode will be overlapped by the corresponding portion of the drain electrode, thereby reducing parasitic capacitance. 6:8-12.

The specification describes two embodiments, with different shape openings, that both achieve the same goal of reducing parasitic capacitance and compensating for misalignment. 4:48-62. AUO's unsupported limitation of "non-rectangle" is thus unwarranted and directly contradicts the specification itself which clearly states "[t]he open portion of the gate electrode can also be shaped like a rectangle." 4:61-62. Hence, LGD's construction should be adopted.

3. *"substantially surrounding the drain electrode"* (claim 1)

LGD's proposed construction is "extending considerably around a portion of the drain electrode." Figures 5-8 clearly depict the source electrode surrounding a considerable amount, but not almost all, of the drain electrode. For example, Fig. 6B shows the source electrode surrounding one section of the drain electrode but another section extends out from the surrounding area. Also, as shown in Figures 7 and 8, a portion of the drain electrode extends out and away from the source electrode, such that it is not surrounded by the source electrode.

Accordingly, in view of the specification, LGD's construction accurately reflects the meaning of substantially surrounding the drain electrode and should be adopted.

H. U.S. Patent No. 7,218,374 – the "ODF Seal" patent

The '374 patent decreases contamination and increases manufacturing efficiency when making liquid crystal panels using the one-drop fill ("ODF") method. Specifically, the '374 patent teaches an improved method of dispensing and curing sealant so that uncured sealant does not contaminate the liquid crystal material.

There are at least two approaches for applying a sealant to a liquid crystal panel: screen printing and dispensing. 2:21-22. The screen printing method uses a screen or mask, onto which the sealant is applied, and which forms the shape of the seal on the underlying substrate. The screen, however, contacts the substrate, which risks damaging components on the substrate. Screen printing also requires excessive sealant material. 2:21-6. Dispensing, in contrast, applies sealant through a nozzle to the substrate. The sealant typically used, however, is highly viscous and accumulates at the end of the nozzle of the sealant dispensing device. This causes dispensing an excessive amount of sealant where initially deposited. When the upper and lower substrates are later attached, this excess sealant spreads inside the panel sealant region, contaminating the display area. The sealant also spreads outward into an exterior region, complicating the cell cutting process (particularly after the sealant is cured). 2:47-54.

LGD's '374 patent solves these problems with the improved dispensing and curing method. Because the nozzle of the sealant dispensing device does not contact the substrate, damage to the alignment layer on the substrate is avoided. Furthermore, sealant is continuously deposited and controlled, so that excess sealant does not accumulate at the nozzle or in the LCD panel sealant pattern. 5:5-7. To avoid the problems concomitant with excessive sealant, the

sealant is initially deposited and begun outside of the display region (*i.e.*, in a dummy region) (70a), so that the excessive sealant will not spread into and contaminate the liquid crystal. Sealant surrounding the display area is referred to as the "main sealant," and sealant formed in the dummy region is referred to as the "auxiliary sealant."

1. "*forming a main sealant*" (claim 1)

The claim construction dispute centers on how the sealant is formed and the extent of the required pattern. Only LGD's proposed construction clearly addresses both of these issues. LGD proposes "forming a main sealant" means "depositing sealant material that encloses the display region." This construction is consistent with the specification as the manner of forming is limited to depositing sealant and does not include screen printing. 2:36-40; Figs. 2B. Neither AUO's nor CMO's constructions address this issue.

Similarly, LGD's construction makes clear that the main sealant pattern fully encloses the display region. 5:5-7; Figs. 3B, element 70b. CMO's proposed construction, however, creates confusion. The functional language "necessary for confining liquid crystal from leaking out between the substrates" does not clearly explain whether the sealant deposited as described and claimed in the patent must fully enclose the display region. For example, CMO's proposed construction may address only a portion of the seal or it could include a subsequent "plug" seal added after vacuum injection is used to fill an injection hole. This possible ambiguity is inconsistent with the '374 patent. AUO's proposed construction is similarly ambiguous.

2. "*wherein the auxiliary sealant and the main sealant are contiguous*" (claim 1)

LGD proposes that "wherein the auxiliary sealant and the main sealant are contiguous" means "wherein the auxiliary and main sealants are deposited in a continuous process." The difference between the parties' constructions centers on the word "contiguous." LGD's

construction adopts a plain meaning for "contiguous," which is "continuous." As defined in the Merriam-Webster Dictionary, "contiguous" means "touching or connected throughout in an unbroken sequence." Ex. L-13(a) (Merriam-Webster (1994) at 250.) Similarly, "continuous" is defined to mean "marked by uninterrupted extension in space, time, or sequence." Ex. L-13(b) (Merriam-Webster (1994) at 251.) In the context of the claims, the auxiliary and main sealant are contiguous when the sealant material is continuously deposited onto one of the substrates to form the auxiliary and main sealant pattern. This parallels the '374 specification, which teaches continuously depositing sealant material to avoid initially depositing excess sealant material from the dispensing nozzle in the main sealant pattern. 5:5-7, Figs. 3B, 4A, and 5A.

CMO's construction of "touches but does not overlap" appears to focus on the ending point of the sealant pattern as opposed to the starting point. Further, this unsupported focus is merely an attempt to create a distinction from its own '179 Patent in which "overlapping" of sealant is a disputed issue (discussed infra). Nothing in the '374 patent's claim language or specification precludes overlapping of the main and auxiliary sealant. In fact, the '374 patent shows the end of the sealant pattern overlapping the beginning of the pattern. Fig. 2B. Similarly, AUO's interpretation of "contiguous" creates ambiguity. AUO's proposed construction of "physically connected" does not address when the physical connection occurs (*e.g.*, during depositing of the sealant material, when the substrates are attached, etc.) or if the auxiliary and main sealants must touch each other.

3. *"preparing a lower and an upper substrate"* (claim 1)

CMO and AUO's assertion that the phrase "preparing a lower and an upper substrate" is indefinite ignores the plain meaning and intrinsic record. Definiteness does not mean absolute clarity. A claim is indefinite only if it is "not amenable to construction" or is "insolubly

ambiguous." *Datamize, LLC*, 417 F.3d at 1347. A term is not "indefinite" simply because it is difficult to construe. If the term can be given a reasonable, even if reasonably debatable, meaning, it is not indefinite. *Id*. at 1747; *Union Pac. Res. Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692 (Fed. Cir. 2001) (the definiteness inquiry "focuses on whether those skilled in the art would understand the scope of the claim when the claim is read in light of the rest of the specification").

The phrase "preparing a lower and an upper substrate" has a straightforward meaning to one of skill in the art. LGD proposes that in the context of the claims and in light of the specification, it means "making the substrates ready for depositing sealant and liquid crystal material prior to attachment." The specification describes "preparing" the lower and upper substrates so that they are ready for sealant and liquid crystal to be deposited thereon. 4:30-67. Moreover, the word "preparing" means "to make ready." Ex. L-13(c) (Merriam-Webster (1994) at 977). Accordingly, this phrase is easily understood in light of the claim language and intrinsic record and should be construed to mean "making the substrates ready for depositing sealant and liquid crystal material prior to attachment."

I. USP 6,803,984 – the "Serial Production Process Line" patent

The '984 patent improves the one drop fill ("ODF") cell manufacturing process by consolidating two production lines into one, thereby improving spatial efficiency and productivity. During the cell process, display manufacturers conventionally used separate production lines to process the color filter ("CF") substrate and to process the thin-film transistor ("TFT") substrate prior to assembling the two substrates. One reason for separate production lines was that each substrate required distinct processes. For example, during ODF manufacture, sealant could be applied to one substrate, such as the CF substrate, while liquid crystal could be

dispensed on the other substrate, such as the TFT substrate. 3:22-36. At the same time, the production lines may share processes, such as cleaning, providing an orientation film and mechanical rubbing. 3:22-35, Fig. 1. This duplication resulted in poor spatial efficiency, higher costs, and productivity losses due to interdependency. 3:36-43.

The '984 patent improves efficiency, productivity, and cost-savings in the ODF manufacturing process by combining these parallel production processes into one, while maintaining an appropriate sequence and organization for each portion of the combined processes. 5:24-30; 7:42-48; Figs. 2-4. Using the method disclosed in the '984 patent, each of the CF and TFT substrates proceed along a common path of a single production line, rather than separate production lines. When the substrates reach a portion of the process *applicable to both*, each substrate is passed through and acted on by that portion of the process (*e.g.*, both types are cleaned, both receive an orientation film, etc.). Alternatively, when a substrate reaches a portion of the process that *is not* applicable to the substrate, the substrate passes through but is not acted on by that portion of the process (*e.g.*, the TFT substrate is not sealed during the sealant material portion of the process). Fig. 2; 7:1-13; JX E-1 ('984 Pros. Hist.) at App. 10/128,452, 01/06/04 Amendment, pages 4-5.

The underlying dispute relates to the overall understanding of the scope of the invention as set forth in claim 1. The defendants improperly seek to limit the invention to a production line with all equipment arranged in a single, straight line such that two substrates used to make an LCD panel must enter one side of each piece of equipment, one substrate immediately followed by the other substrate, and that the substrates must exit the other side of that equipment, one immediately after the other. This interpretation is unsupported by the '984 patent or prosecution history. Defendants' proposed constructions should be rejected as discussed below.

1. *"on a single production process line"* (claim 1)

LGD proposes this phrase means "on a production line where the processing equipment is arranged along a common path for performing the liquid crystal cell processes." The patent provides for a combined manufacturing line, wherein "the processing equipment can be considered as equipment for the TFT substrate, equipment for the color filter substrate or both." 5:24-30. LGD submits that the single production process line contemplates an area or "common path" where the substrates travel and are provided to each portion of the process and its corresponding equipment. 5:26-30.

Defendants' constructions seek to limit the production process line to require a linear orientation of equipment. CMO proposes "only one direction without branching," while AUO proposes "in a single, linear arrangement." D.I. 376 at E-2. Claim terms, however, should not be read in isolation. Defendants focus on a geometrical understanding of the word "line" ignores the claim language "*production process* line" which denotes "an arrangement of operations in manufacturing permitting sequential occurrence on various stages of production." Ex. L-15(a) (Merriam-Webster (1994) at 677 (definition of "line")). Accordingly, LGD asks that the Court reject the defendants' unreasonably narrow proposals and instead adopt LGD's proposed construction.

2. *"passing the first and second substrates through a sealing material coating portion of the single production process line in serial order"* (claim 1)

LGD submits this phrase means "passing the first and second substrates, one after the other, along a portion of the single production process line where the sealing material is selectively applied." The principle differences between the parties' constructions for this phrase are the meanings of "sealing material coating portion" and "serial order."

a. "*sealing material coating portion of the single production process line*"

The first issue is whether the phrase "portion of the single production process" is limited to specific equipment.[3] Such a limitation is inconsistent with the claims and '984 specification. LGD instead proposes the term means "a portion of the single production process line where the sealing material is selectively applied." LGD's construction is fully supported by the specification, which teaches that the sealing material coating "portion" of the process is the step that includes processing equipment, such as equipment for selectively applying sealant material to one of the substrates, and a common path by which the substrates proceed to the processing equipment. 5:24-30. Moreover, construing "portion" as a part of the overall production line (including the common path) is consistent with the dictionary definition, which defines "portion" as "an often limited part set off or abstracted from a whole." Ex. L-15(b) (Merriam-Webster Dictionary (1994)). In fact, the specification frequently uses the term "step" in lieu of "portion," referring to the "sealing material coating step." 5:47-50; 5:53-55; 5:59-61. Consistent with the definition of "portion," and LGD's proposed construction, the term "step" is defined as "a stage in a process." Ex. L-15(c) (Merriam-Webster Dictionary (1994)).

CMO and AUO's proposed constructions, in contrast, attempt to limit "portion of the single production process" to mean "in at one end, and out at the other end, *of a machine*." D.I. 376 at E-3 (emphasis added). Although the patent provides that both substrates "pass[ ] through

[3] The following analysis applies equally to construction of the phrase "passing the first and second substrates through a liquid crystal dispensing portion of the single production process line in serial order." Consequently, for the following reasons, LGD also proposes that the Court should construe the phrase to mean "passing the first and second substrates, one after the other, along a portion of the single production process line where liquid crystal is selectively dispensed." D.I. 376 at E-5.

the sealing material coating step" (5:46-50; *see also* claim 1, 4:1-11; 4:17-26; 6:35-41; 6:62-67), and the sealant material coating is applied to either one *or the other* substrate (7:1-13; JX E-1 (App. 10/128,452, 01/06/04 Amendment, pages 4-5)), nowhere does the intrinsic record describe or suggest that both substrates must enter one side and exit the other of a sealant material coating *machine*. Indeed, to do so would be inconsistent with the stated objective of the patent, which is to "maximize spatial efficiency and improve productivity," rather than create pointless motion. 3:52-53. Furthermore, dependent claim 10 recites providing the substrates "in a same cleaning unit", which CMO and AUO agree means a "cleaning machine." D.I. 376 at E-7. The terms "unit" and "portion" denote different meanings and "portion" is not properly limited to specific equipment.

b. "*serial order*"

The term "serial order" is also in dispute. LGD contends that "serial order" relates to the sequence of processing and, therefore, means "one after the other." LGD's construction matches the intrinsic record and common meaning of the term. Ex. L-15(d) (Merriam-Webster Dictionary, (1994) (Serial: 1. of, relating to, consisting of, or arranged in a series, rank, or row. Series: 1a. a number of things or events of the same class coming *one after another* in spatial or temporal succession.). CMO and AUO contend that serial order means "one after the other *without anything in between*." 376 at E-4. The additional limitation is ambiguous, not supported by the intrinsic record, and should be rejected.

3. "*assembling*" (claim 1)

CMO and AUO contend that the phrase "assembling" is indefinite. Their position again ignores the plain meaning of this phrase as well as the intrinsic record. The phrase "assembling" has a plainly understood meaning, namely "bringing together." This is supported by the

specification, which clearly describes bringing the TFT and CF substrates together after substrates have passed through the liquid crystal dispensing portion and the sealant material coating portion to form a liquid crystal panel. 4:30-67. Moreover, this construction is consistent with the dictionary definition of "assembling." Ex. L-15(e) (Merriam-Webster Dictionary (1994) (1. to bring together 2. To fit together the parts of)). Thus, this phrase is easily understood in light of the claim language and intrinsic record and should be construed to mean "bringing together."

III. PROPOSED CONSTRUCTION OF CLAIM TERMS OF THE AUO PATENTS

A. U.S. Patent No. 7,101,069 – the "Elongated Lamp Support" patent

The '069 patent describes mechanical problems for LCD backlights that were realized as display sizes grew. With increasing display dimensions, the lamp tubes in the backlights lengthened and the optical diffusers necessarily covered larger areas. These greater dimensions required additional supports to prevent bending of the components. The bending problem and support solutions, however, were known prior to the '069 patent. In fact, examples of prior art lamp supports and diffuser supports are shown in Figures 1 and 2 of the '069 patent, reproduced here. A prior art diffuser support (13) is shown in Figure 1; and a prior art lamp support (23) is shown in Figure 2.

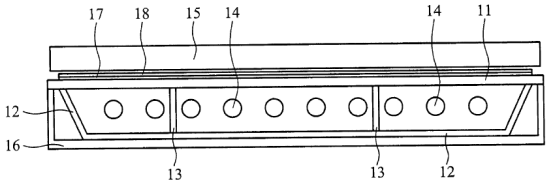


FIG. 1 (PRIOR ART)

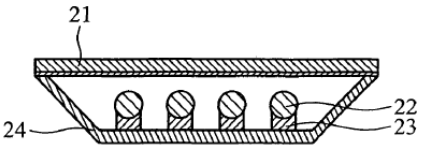


FIG. 2 (PRIOR ART)

The apparent difference between the example prior art and the claimed "invention" in the '069 patent was the modification of the lamp support. According to the '069 patent, by elongating the sides of the lamp support beyond the top of the light tube, the same structure

simultaneously supported the lamp and the diffuser. 1:43-45. As shown in Figure 3 of the '069 patent, lamp supports (140) hold the lamp tubes (130) and simultaneously prevent the diffuser (110) from bending. 2:39-41. Several other examples of modified lamp supports were included as figures in the patent. Figs. 5A-G.

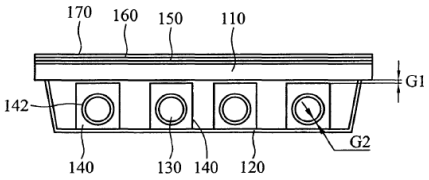


FIG. 3

1. "fitting portion" and "two side walls" (claims 1 and 16)

Each of the identified claim terms has one fundamental issue underlying the dispute – whether the two side walls of the fitting portion are required to hold the light tube. Read in the context of the claims and in light of the specification and prosecution history, LGD contends that is precisely what is disclosed and claimed in the '069 patent. The relevant "support" limitation as recited in claim 1 is:

> a support disposed between the diffuser and the reflecting plate, the support having a *fitting portion*, wherein: the fitting portion comprises *two side walls* extending upwardly and separately, the illumination tube is disposed in the fitting portion and between the side walls, and at least one of the side walls extends toward and beyond the top of the illumination tube for preventing bending of the diffuser.

The claim language itself makes clear that the support has a fitting portion with two side walls that extend upward and hold the light tube between them. Consequently, LGD proposes (a) that ***a fitting portion*** means: "the portion of the support designed to hold an illumination tube;" and (b) that ***two side walls extending upwardly and separately*** means: "two upright structures that are spaced apart and that are designed to hold the illumination tube."

These constructions are, likewise, supported by the '069 patent specification. For example, as shown in Fig. 5F and Fig. 5G of the patent, reproduced here, a support (140) includes one or more fitting portions (142). Each of the fitting portions have upright sidewalls that are designed to hold a light tube. LGD's constructions are consistent with all the

embodiments disclosed in the patent, and properly are not limited to those embodiments. Furthermore, LGD's constructions make clear that a necessary purpose of the fitting portion is to hold the illumination tube.

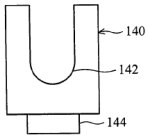


FIG. 5F

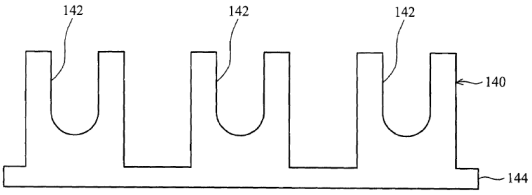


FIG. 5G

AUO's proposed constructions, however, interject ambiguity into the scope of the claims. For example, it is not clear from AUO's construction whether the fitting portion is required to support the light tube or, instead, whether it merely requires that it "accommodate" the light tube. Similarly, AUO proposes no insight into the meaning of the "two side walls" claim limitation. AUO's proposed constructions are also inconsistent with the disclosed embodiments of the '069 patent. According to AUO's constructions, a fitting portion must only "accommodate" a light tube and the fitting portion's two side walls simply extend upwardly. Applying these constructions permits parts of different fitting portions to be selected as a single fitting portion – such as highlighted here in Fig. 5G of the '069 patent. AUO's imprecise claim interpretation is unhelpful in understanding the meaning of the claim scope. The confusion in AUO's constructions is further demonstrated by applying them to a modified version of Fig. 5G. AUO proposes a construction in which the support for the light tube is not even required to support the diffuser; and instead allows two separate support structures – one for the light tube and one for the diffuser – as in the prior art. This construction would be inconsistent with the claims and the specification. The fitting portion of the claimed support

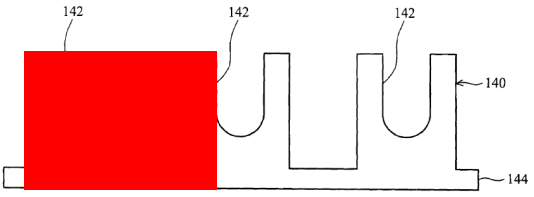
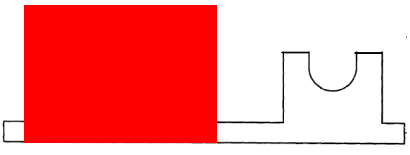


FIG. 5G



AUO's "Fitting Portion"

is required to simultaneously hold the light tube and prevent the diffuser from bending. 2:39-43; Fig. 3.

B. U.S. Patent No. 6,976,781 – the "Hooks and Holes Connector" patent

The '781 patent describes a design for snapping together and taking apart a backlight unit. The patent specifies an orientation of "hooks" and "holes" on a front frame (typically made of plastic) and a back bezel (typically made of metal) so that the frame and bezel may be readily assembled and disassembled. All of the components, except for the specific orientation of hooks and holes, are disclosed in the applicants' admitted prior art of the '781 patent. 1:30-2:25; Figs. 1-3. The supposed problem with the admitted prior art was a design tradeoff between ease of disassembly and structural strength. 2:20-22.

The first category of admitted prior art design had hooks on the sides of the metal bezel and holes on the side of the plastic frame. Figs. 1-2. The frame snapped over the bezel so that the hooks engaged the holes. Because the outer frame was made of plastic, the edges of the frame were relatively easy to bend away from the hooks to disassemble the module. 1:44-2:7. The corollary of a flexible outer frame for ease of disassembly, however, was lack of structural support. *Id*. The other category of admitted prior art simply reversed the orientation of hooks and holes. Fig. 3. As such, the holes in the sides of the metal bezel snapped over the hooks on the sides of the frame. While the metal outer bezel increased structural rigidity, the outer metal structure was difficult to bend away from the hooks for disassembly.

The supposed improved design described in the '781 patent reorients the hooks and holes so that *some* hooks are on the front plastic frame and *some* hooks are on the back metal bezel. Figs. 4-5. Consequently, two opposing sides of the plastic frame are on the outside of the

module for ease of disassembly and the other two opposing sides of the metal bezel are on the outside of the module for structural rigidity. 2:8-20.

1. *"on outer surfaces of said first edge a plurality of first hooks are formed to protrude outwardly"* (claim 1)

The fundamental issue is whether the "hooks" must be formed as a part of the frame component (from the same piece) or may be separate components, such as screws. Read in context of the claims, specification, and prosecution history of the '781 patent, the hooks must be formed as a part of the frame component. The relevant portion of claim 1 recites:

> a frame, having a first edge and a second edge, wherein on outer surfaces of said first edge a plurality of first *hooks are formed* to protrude outwardly, and on outer surfaces of said second edge a plurality of first *holes are formed*;

(emphasis added.) This language makes clear that a plurality of hooks and holes are formed on respective first and second edges of the frame. There should be no dispute that to form a hole in one side of the frame requires that the hole be in the side and part of the frame structure itself. The claim requires that the hooks and holes are both formed on outer surfaces of the frame. Just as the holes must be part of the frame so, too must the hooks. All of the figures and embodiments disclosed in the specification describe the hooks as part of the frame and bezel structures. Figs. 1-5. For example, the specification teaches that the frame and bezel of Figure 5, reproduced here, are disassembled by "pressing slightly the hooks 218 of the bezel 210 and pulling the long edges 202 of the frame 200." 3:49-54; *see also* 2:1-5, 16-8. The specification clearly describes that the hooks are limited to protrusions that are part of the frame

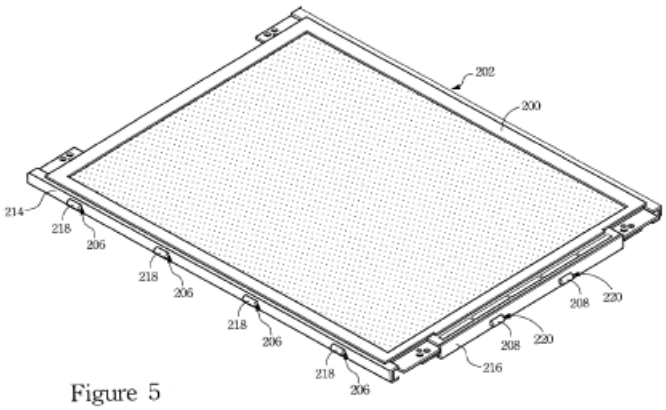


Figure 5

and bezel structures and not simply "any protruding structure intended to be inserted into a hole", such as a screw, as proposed by AUO. Consequently, LGD's proposed construction "two or more protrusions that are part of the frame and that extend outwardly from the first edge for fastening the frame to the bezel" should be adopted.[4]

2. *"as said frame is mounted onto said bezel"* (claim 1)

Claim 1 further requires that the hooks are inserted and engaged in corresponding holes "as said frame is mounted onto said bezel." This must be construed, as LGD proposes, to mean "at the same time when the frame and bezel are joined." This construction follows from the clear meaning of the claim language and the disclosure in the specification. In addition, this claim language further supports the fact that the hooks must be formed as part of the frame in order for the hooks to be inserted and engaged with corresponding holes in the bezel as the frame is mounted onto the bezel; otherwise, the hooks would be inserted and engaged at some point in time after the frame is mounted onto the bezel.

During the prosecution history of the '781 patent, AUO argued that "the key point of the assembling structure of the present invention is to have two opposite long edges (202) of the rectangular frame (200) attach to an outside of the long sidewalls (214) of the bezel, and simultaneously to have two opposite short edges (204) of the rectangular frame (200) attach to an

[4] In addition to the term "on outer surfaces of said first edge a plurality of first hooks are formed to protrude outwardly," several other terms contain the same disputed issue. These are (i) "on outer surfaces of said second sidewall a plurality of second hooks are formed to protrude outwardly," (ii) "on outside surfaces of said first edge first hooks are formed to protrude outwardly," (iii) "on outside surfaces of said fourth edge second hooks are formed to protrude outwardly," (iv) "on outer surfaces of said second sidewall a plurality of first hooks are formed to protrude outwardly," and (v) "on outer surfaces of said first edge a plurality of second hooks are formed to protrude outwardly." These terms should, likewise be construed to require the

(Footnote cont'd on next page.)

inside of the short sidewalls (216) of the bezel." JX N-1 (App. 10/446,103, 06/08/2005 Amendment, p. 4). This "simultaneous" requirement of the frame and bezel components, which AUO argues is the "key point of the assembling structure," cannot be accomplished unless the hooks are formed as part of the frame component (e.g., from the same piece).

Just as AUO's proposed construction for hooks that apparently includes screws is inconsistent with the '781 patent, AUO's proposed construction for "as said frame is mounted on said bezel" to mean "during the process of mounting the frame onto the bezel" is also inconsistent with the patent as it seeks to permit the mounting to include the process of inserting the screw. This construction is inconsistent with the claims, specification, and prosecution history. Only LGD's proposed constructions are consistent with the disclosure of the '781 patent and, therefore, should be adopted.

C. U.S. Patent 7,125,157 - the "Optical Film Positioning" patent

The '157 patent describes structures for positioning an optical film in an LCD backlight unit that can be rotated. When rotating LCDs from an initial position, stress at optical film fixing points causes visual defects. This stress occurs when optical films are attached to frames using fixing points positioned along either (i) opposite edges of the film not sized to allow for film expansion or contraction, or (ii) only one edge of the film resulting in an asymmetrical position when rotating the device. 1:49-51; 2:1-9; Figs. 1A-B. The '157 patent describes a film positioning structure that arranges first fixing points along an edge to support the film only when

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(Footnote cont'd from previous page.)

hooks to be formed as part of the corresponding frame, bezel, upper frame, or lower frame. L-17.

the device is in a first position and second fixing points that do not touch the film when in first position, allowing for film expansion and contraction, along another edge. When rotating the device to a second position, the second fixing points support the film, but the first fixing points do not touch the film, allowing for film expansion and contraction. 8:35-44; Figs. 3A-4D.

1. *"a first supporting portion, disposed on the frame"*[5] (claims 1 and 16)

The main dispute is whether the first supporting portion supports the optical film when the backlight unit is in a second position. Consistent with the claims and specification, LGD contends that the first supporting portion is designed to support the film when the backlight unit is in a first position, but not when in a second position. The relevant language in claim 1 is:

> "when the frame is disposed *in a first position, the first supporting portion partially contacts an inner wall of the first constraining portion* for positioning the film, and the second supporting portion does not contact the second constraining portion; and when the frame is disposed *in a second position*, the second supporting portion partially contacts an inner wall of the second constraining portion for positioning the film and *the first supporting portion does not contact the first constraining portion.*"

(emphasis added). The claim language clearly states that the first supporting portion does not contact the optical film when the frame is in a second position. The first supporting portion, therefore, cannot "support" the optical film because it does not contact the optical film.

The '157 patent specification further supports LGD's construction:

> When the frame **15** is disposed at the first position, the first supporting portion P_1 contacts the first hole H_1 to support the optical film . . . The second supporting portion P_2 does not support the optical film **12** at the first position . . . When the frame **15** is rotated to the second position (FIG. 3B) by rotating 180º, . . . only the second supporting portion P_2 supports the optical film **12**. . . . The first supporting portion P_1 does not support the optical film **12**, leaving a gap G_1 therebetween.

[5] The term "a second supporting portion, further disposed on the frame" contains the corollary issue. LGD's proposed construction for this term is set forth in L-18. See also D.I. 376 at Q-2.

5:39-67. Similarly, the patent's figures highlight that the first supporting portion does not support when the backlight unit is disposed in a second position. Figs. 2A, 3A-4D.

AUO proposes a construction for "supporting portion" that ignores these critical differences and interjects ambiguity with "intended to support the film." This allows, for example, the first supporting portion to support the optical film regardless of frame position which is inconsistent with the invention's purpose and the intrinsic record. Thus, LGD's proposed construction "a first projection from the frame that supports the film when the backlight is in a first position" should be adopted.

2. *"a first constraining portion"* (claims 1 and 16)

As with the previous term above, the issue is whether a first hole in the optical film receiving a first supporting portion is a "first constraining portion" when the backlight unit is not in a first position. Consistent with the claims and specification, LGD contends a first hole cannot be the first constraining portion unless the backlight unit is in the first position. The specification repeatedly explains that a hole does not "become" a constraining portion until a supporting portion contacts an inner wall of the hole to support the film. 6:22-25. The specification states that "the shapes of the holes *determine the moveable range of the support portions*, thereby constraining the supporting portions." 6:47-49 (emphasis added). The hole that becomes the first constraining portion must be shaped so as to constrain movement of the first supporting portion when the backlight unit is in the first position.

The '157 patent specification embodiments and figures all have the first hole H_1 shaped with a gap above G_3 and below G_2 the first supporting portion P_1 when the backlight unit is *not* in the first position (Fig. 3B) so the first hole H_1 does not constrain movement of the first supporting portion in the direction of gravity (J-direction). The hole receiving the first

supporting portion is only a "constraining portion" when the backlight unit is in a first position such that the inner wall of the hole restricts movement of the supporting portion in the J direction. 5:37-39; 6:22-25; 47-49; Figs. 3A-4D. When the backlight unit is in a second position, the hole does not touch the first supporting portion so it cannot constrain the first portion.

As above, AUO's proposed constructions fail to distinguish between the "first" and "second" constraining portions because they simply define a constraining portion as a hole in the optical film intended to restrict the movement range of the optical film. Thus, LGD's proposed construction "a first passage through the film that has a gap in the gravity acting direction after receiving a supporting portion" should be adopted.

3. *"disposed in a first position"* (claims 1 and 16)

The dispute is whether the frame is in an initial position when the first supporting portion is located near an upper edge of the frame, as contended by LGD and consistent with the claims and specification. Claim 1 requires "when the frame is disposed in a first position, the first supporting portion partially contacts an inner wall of the first constraining portion for positioning the film." The specification embodiments and figures all disclose that the optical film is *only* supported by the supporting portions that are located near the upper edge of the film and that the upper edge of the film changes depending on the orientation of the frame. 5:17-23; 55-9; 6:57-61; 7:29-33; 7:49-52; 7:57-59; 7:65-8:2. AUO's proposed construction is ambiguous and unhelpful as it simply replaces the word "first" with "initial" and does not define the first position. Thus, LGD's construction "in an orientation where the first projection is located near an upper edge of the frame" should be adopted.

D. U.S. Patent No. 6,689,629 –the "Dummy Etching Patterns" patent

The '629 patent describes issues with traditional etching procedures for the scan and signal lines comprising a double layered structure, such as aluminum covered by molybdenum. The patent explains that it is difficult to achieve a desired taper shape metal layer given metal characteristics and current etching procedures. Generally, etching techniques result in a large difference between the surface areas of the aluminum and molybdenum layers exposed to the etchant at the point when the molybdenum surface only exposes the side. This difference causes a current to flow out of the molybdenum, passivating the molybdenum such that the resulting structure has a large overhang of molybdenum over the aluminum. Fig. 10. This overhang can decrease manufacturing yield by causing interlayer shorts that lead to defective TFTs. 2:58-63.

The '629 patent proposes a way to avoid these etching process defects over the entire surface of the substrate, allowing all the scan and signal lines to achieve the desired taper shape. 5:34-37. It describes a particular issue with the etching process in areas of the substrate where the wiring density is low, such as between connection pads and the ends of pixel electrodes. 1:61-67. To address this issue, the patent suggests using dummy patterns, of the same material as the scan and signal lines, to decrease the difference between the aluminum and molybdenum surfaces exposed to the etchant. The patent claims that including dummy patterns in between connection pads and the ends of pixel electrodes so as to make up 30% of the area of the layer of the scan and/or signal lines, allows the scan and/or signals lines to achieve the desired taper angle. 5:62-67, 6:38-43.

1. *"area" / "a layer of an insulating substrate, having an area"* (claims 1 and 9)

The fundamental dispute is the construction of "area." LGD contends that "area" is indefinite because, even with a thorough review of the entire intrinsic record, one of ordinary

skill could not understand what the claims cover. In the alternative, the only way "area" can be construed is in the context of the entire first limitation, as "material deposited and patterned on a substrate, such as glass, that covers part of the array substrate surface."

The construction of this limitation is critically linked to the other limitations of the claim. The specification states that the purpose of the invention is to achieve good wiring over the entire surface of the substrate. 5:34-37. To influence the etching procedure, the dummy patterns must be made of the same material as the scan and/or signal line wirings. 5:38-43. Therefore, the first element introduces the substrate "layer" that will include the necessary wiring and dummy pattern structures. This element also introduces the "area" of the layer as the basis for identifying, in the last element, the requirement that dummy patterns comprise at least 30% of such area in order to achieve the desired taper angle for the scan and/or signal lines. The limitation "forming a layer of an insulating substrate, having an area" in claim 9 further supports LGD's construction. This limitation requires that a layer is formed (i.e. deposited and patterned) to cover part ("an area") of the array substrate surface.

The specification further demonstrates that LGD's proposal is the only plausible construction. Notably, the specification discusses the desire to prevent interlayer shorts. 2:58-63; 7:55-57. Interlayer shorts occur between the scan line metal layer and signal line metal layer, or between the scan line metal layer and the semiconductor layer. These layers generally overlap in the TFT array. The specification is, therefore, clearly stating that the invention is not concerned with just one small particular area, but instead the entire area on which the layer is located, i.e. where the interlayer shorts resulting in decreased yield occur.

AUO's proposed construction provides no assistance in understanding the term "area." It simply replaces an ambiguous term with an equally ambiguous phrase. AUO's construction

essentially claims that any area, large or small, where a solid land pattern is formed between the connection pad and the edge of the pixel electrodes, would satisfy the 30% dummy area element. This is inconsistent with the claims, specification and prosecution history, and provides no guidance as to the scope of the claims. Accordingly, AUO's construction should be rejected.

2. "*dummy patterns*" (claims 1 and 9)

Consistent with the plain and customary meaning of the term, and supported by the intrinsic record, LGD contends that dummy patterns are "portions of the layer that do not receive or convey voltages or signals." The ordinary meaning of "dummy" is this context is "pertaining to a nonfunctioning item used to satisfy some format or logic requirement or to fulfill prescribed condition." Ex. L-21(a) (IEEE The Authoritative Dictionary of IEEE Standard 7th ed. (2000)). As such, in the context of the claims, the dummy pattern must be "nonfunctioning," *i.e.*, they do not receive or convey voltages or signals, but instead are to fulfill the prescribed condition of achieving a good taper shape of the wiring. 5:34-37, 6:38-43.

The claim language itself requires that the dummy patterns not be in contact with the wirings, and makes no reference whatsoever to the operation of the display. AUO, however, now improperly seeks to add such a limitation. Nowhere does the specification suggest that the nonfunctioning characteristic of the dummy patterns is limited to the operation of the display, as AUO claims. In fact, AUO's construction does not reconcile with claim 9 in which the method of forming an array substrate includes "forming dummy conductive patterns." Operation of the display during TFT manufacture is irrelevant. According to AUO's construction, a pattern may serve an electrical function during manufacture and test, then somehow become a dummy pattern after this process. This also contradicts the specification that states the dummy patterns can be removed from the display, demonstrating that dummy patterns must be non-functioning

throughout the entire manufacturing process, not only during display operation. 6:52-55.

Furthermore, the only way for the dummy patterns to contribute to the taper shape and achieve the goal of the invention is if the dummy patterns are of the same material as the wiring. 5:34-43. Thus, the dummy patterns must be formed as part of the same layer as the plurality of wirings. Accordingly, dummy patterns in the context of the '629 patent are "portions of the layer that do not receive or convey voltages or signals."

3. *"dummy patterns comprising at least about 30% of the area of the insulating substrate, the dummy conductive patterns situated between the connection pads and the pixel electrodes"* (claims 1 and 9)

LGD's proposed construction is "approximately 30% or more of the area of the layer is made of dummy conductive patterns that are located between the connection pads and an outer edge of the pixel electrodes in the pixel array." As discussed above, in the context of the claims, the term "area" refers to the area of the layer. The specification adds that there is low wiring density between the connection pads and the edge of the pixel electrodes, so that for the entire area of the layer to achieve the desired taper angle, 30% of the area must include dummy patterns between the connection pads and edge of the pixel electrodes. 5:34-38; 5:62-6:1; 6:9-14; 7:5-8.

4. *"plurality of wiring arranged on the insulating substrate"* (claim 1)

LGD contends that the proper construction is "portions of the layer that convey voltages or signals from the connection pads to the thin film transistors in the pixel array." Again, this element must be viewed in the context of the intrinsic evidence. The claim language itself and the specification discuss at length the critical link between the dummy patterns and the wiring. Without comprising the same materials as the wiring, the dummy patterns would have no effect on the potential undercut of the wirings. 5:34-43, 6:35-43. Thus, AUO's construction ignores the fundamental issues addressed by the '629 patent and should be rejected.

E. U.S. Patent 5,748,266 --the "Color Filter Spacer" patent

The space, or cell gap, in the pixel area between two substrates of an LCD is important to the operation of the display and must be maintained at a designed value. 4:11-18. Historically, ball spacers were scattered inside the display to maintain the constant cell gap, but those spacers have various disadvantages. 1:30-2:24; 3:66-4:21; Figs. 1-2. The '266 patent describes using pillar-like spacers made of color filter material that specify a cell gap between the two substrates of an LCD device.[6] In addition, the '266 patent describes signal delays in a common electrode that worsen as displays increase in size.[7] The patent describes an approach to address this concern by covering the color filter spacer with the common electrode. 4:65-5:03. The pillar-like spacers then electrically connect the common electrode on the color filter substrate with the storage capacitor lines on the array substrate within the pixel area. 4:65-5:11; Fig. 8.

1. *"pillars formed higher than other portions of the color filter"* (claim 1) and *"pillars of a color filter"* (claim 9)

The principal dispute regarding these terms focuses on what a pillar is. Within the various disputed term constructions, only LGD offers an explanation of this element, whereas AUO proffers no insight into its meaning. In accordance with the disclosure of the '266 patent, a pillar is a patterned structure that acts as a spacer to regulate the cell gap in the pixel area. The

[6] In the LCD industry, "pillars" are generally called "pillar-like spacers" or "patterned spacers". For example, JP No. 5196946, one of the prior art references disclosed in the specification, discloses pillar-like spacers that are formed by superimposing patterned red, green, blue color filter materials to specify a cell gap between the two substrates. The '266 patent distinguishes the invention over these prior art by stating that "any one of these disclosures does not show means for solving the problem of signal delay in a TFT-LCD using the H/com inversion driving method."

[7] The signal delay of Vcom in the '266 patent means an RC delay of an alternating (AC) type of Vcom around the central portion of a common electrode. (*See, e.g.*, 2:61-3:04; 4:53-57).

patent explains that "the present invention" uses a pillar of a color filter instead of a spacer in order to keep a cell gap between two substrates constant and that the spacers are covered with the common electrode everywhere in a pixel area. 4:65-5:6. Similarly, the patent states that specifying a cell gap with pillars of the color filter in the pixel area eliminates the requirement of using a spacer scattering process. *See* '266 Abstract. The patent also describes the pillars covered with the common electrode in the central region of the pixel area to prevent signal delay in this area of the common electrode. 4:53-57. The patent further describes "pillar-like spacers" in JP No. 5196946 as pillars. 4:21-30. All the embodiments and figures in the patent, moreover, confirm that "pillars" are patterned structures acting as spacers. Figs. 8-11 (showing pillars (78) located in a pixel area and fixing constant cell gap by contacting objects on the array substrate). Thus, the patent makes clear that "pillars" are "pillar-like spacers" used to replace ball spacers.

The term "pillars" in claims 1 and 9 should be construed to be made of color filter material. Claim 1 refers to "the color filter comprising a plurality of pillars" and claim 9 similarly refers to "pillars of a color filter." In claims 1 and 9, therefore, the "pillars" are necessarily color filter pillars. The "Summary of the Invention" and "Abstract" further explain that the pillars are color filter pillars.[8] Moreover, all embodiments and figures of the patent describe that pillars are made of color filter material.

Accordingly, LGD's proposed constructions (a) "patterned structures of the color filter that protrude toward the pixel array beyond the height of non-pillar portions of the color filter

[8] In addition to using "color filter" as a modifier, the "Summary of the Invention" at 5:57-59 describes that "[a] pillar of a color filter on a facing substrate requires **only change of mask patterns for the color filter** but the number of processes does not increase," (emphasis added) clearly indicating that "pillars" are color filter material.

substrate to act as a spacer" and (b) "patterned structures that protrude toward the pixel array, to act as a spacer, and are made of color filter material" should be adopted.

2. "*the pillars are covered with the common electrode*" (claim 1)

LGD proposes a common understanding of this term: "the common electrode is formed to cover the protruded surface of the pillars." All the descriptions of the patent including the "Abstract," "Summary of the Invention," and the embodiments shown in Figures 6-11 are directed to "pillars" that electrically connect the common electrode on the color filter substrate with the storage capacitor lines on the array substrate to prevent a signal delay of a common voltage. Thus, the common electrode covers the protruded surface of the pillars because the electrode is formed *after* the pillars and *across* the protruded pillar structure. Fig. 8 (common electrode (30) across protruded surface of pillar (78)).

3. "*storage capacitance line*" (claim 9)

In accordance with the disclosure of the patent, this term is properly construed as "a pattern of electrically conductive material within the pixel areas for providing a reference voltage to the storage capacitors." Fig. 11. As described in the patent, a conductive laminate structure (84) is formed on the storage capacitor line (28) in the pixel area to electrically connect the storage capacitor line (28) to the common electrode (30). The conductive laminate structure is also provided to "fine-adjust" a cell gap between the pillars (78) and the storage capacitor line (28). 7:52-60. As discussed above, the '266 patent uses pillars that electrically connect the common electrode on the color filter substrate with the storage capacitor lines on the array substrate. Thus, the height of the storage capacitor line, in claim 9, means the thickness of the storage capacitor line within the pixel array to specify a constant cell gap throughout the display.

F. U.S. Patent 5,748,944 - the "Spacer Hardness" patent

The '944 patent concerns the mechanical hardness of pillar-like spacers that are patterned in the pixel area between the two substrates of an LCD device. Spacers are used to provide uniform cell gaps between the substrates. Ball shaped spacers made of plastic material scattered inside the display are one type of spacers used, but ball spacers have various disadvantages including degrading contrast ratio and causing variations in density because they are not attached to the substrates. 1:19-30. Prior art describes techniques for forming pillar-like spacers made of photosensitive resin, but these prior art techniques have problems, including spacers that are either too rigid, resulting in the formation of bubbles in the liquid crystal, or too soft, resulting in spacers becoming deformed when pressed thus, affecting image quality. 1:31-2:31.

The pillar spacers described by the patent are comprised of photosensitive resin having specific hardness values such that the spacers return to the previous state without being destroyed and can prevent the formation of low-temperature bubbles. 2:32-3:2, 8:09-20. The patent describes various values for pillar-like spacers: i) the dynamic hardness value ("DH") is between 26 and 30; ii) the plastic deformation hardness value ("HV") is 38 and 46; iii) the column occupancy ratio ranges from 0.05 to 0.86%; iv) the ratio of one side of the upper bottom of the spacers to one side of the lower bottom is between 50 and 90%; v) the elastic coefficient ranges from 100 to 500 Kg/mm^2; and the linear expansion coefficient is preferred to be nearly equal to the volume expansion coefficient of liquid crystal. 3:54-6:46.

The '944 patent purports to provide a formula for determining the dynamic hardness value that includes determining both the elastic deformation and plastic deformation values. 3:54-4:17. The patent also purports to provide a formula for determining the plastic deformation

hardness value. 4:18-51. The occupancy ratio refers to the number of spacers included on the array substrate and is also expressed by a formula in the patent. 4:56-5:16.

1. *"dynamic hardness value"* and *"hardness value of plastic deformation"* (claims 1 and 4)

The '944 patent describes that dynamic hardness "means hardness obtained when the load is sequentially varied to be extrapolated to a zero load and parameter means a target load. This dynamic hardness represents a function of depth to the hardness because this dynamic hardness varies the load sequentially." 4:01-07. The patent provides the following formula for purportedly determining *dynamic hardness value* (DH): $DH = K \times Pmax/hmax^2$ where Pmax equals maximum load, and hmax equals total maximum variation obtained by adding elastic deformation and plastic deformation. 3:60-65; *see also* claim 1.

The patent provides the following formula for purportedly determining *plastic deformation hardness value* (HV): $HV = K \times Pmax/hr^2$ where Pmax equals maximum load, and hr equals variation when the tangent in the maximum variation point of a curb has no load in the case of unloading. 4:18-29; *see also* claim 1. Further, the constant "K" in both formulas "represents a value obtained by the variation of an indentator inherent to the liquid crystal display." 3:66-4:1; 4:30-32.

Assuming *arguendo* that the constant "K" specific to the shape and angle of the indentor correlates the geometry effects, the formulas for DH and HV are indefinite, because they do not provide any information on the value of maximum load (Pmax), the speed with which the indentor is applied to the spacers, or the underlying layer and/or substrate during measurement. The material behavior of the spacers in response to a sequentially varying applied force would be different depending on these variables and would result in different values of DH and HV. Because the definitions in claim 1 do not specify these measurement conditions, the claimed

ranges of DH and HV do not present a clear boundary to the public and are thus indefinite under 35 U.S.C. § 112, ¶2.

2. *"at least one of the group consisting of"* (claim 4)

The '944 specification explains that the spacers should be made of photosensitive resin that has a hardness value and plastic deformation value within a certain range. 3:55-60, 4:18-22. The specification states that certain effects can be obtained if one of these is met, but both are desirable. 4:52-55. Claim 4, however, includes additional variables discussed in the specification. Specifically, claim 4 states that selecting a photosensitive resin comprises choosing a resin based on it having at least one of the following characteristics: i) a specific dynamic hardness value; ii) a specific plastic deformation hardness value; iii) a specific elastic coefficient and a linear expansion coefficient; iv) a specific spacers size; and v) a specific column occupancy ratio. The last two are not material characteristics which would provide a basis for selecting a photosensitive resin material but instead are merely related to design aspects for manufacturing an LCD.

The claim's suggestion that the photosensitive resin can be chosen based on spacer size or occupancy ratio is not logical because selecting a resin based on spacer size alone may not result in a resin that inhibits generation of low-temperature bubbles or is resistant to local loads. 2:32-37. Similarly, selecting a resin based on column occupancy ratio would suffer the same problems. Accordingly, the term **"**at least one of the group consisting of**"** is indefinite as a result of the inclusion in the claim of both occupancy ratio and spacer size.

3. *"the length of one side of the upper spacer surface"* (claim 2)

This term in claim 2 relates to a rectangular spacer. A rectangular spacer has sides at the top with length and width and sides at the bottom with length and width. Because it is unclear

which lengths and widths should be used for measurement, this term is indefinite under 35 U.S.C. § 112, ¶ 2. Further, the measurement of "the length of one side of the upper spacer surface" requires multiplying the height of the spacer by an unspecified and varying constant below 1. 5:62-6:15. Accordingly, this term is indefinite under 35 U.S.C. § 112, ¶2.

G. U.S. Patent No. 6,778,160 – the "Ideal Brightness Level Determinator" patent

Image quality of LCDs is reduced because of the slow response time of the liquid crystal. According to the '160 patent, this is the amount of time required to change the orientation of liquid crystal molecules by applying a voltage to reverse color, *e.g.*, from black to white, and then to restore the original color, *e.g.*, back to black, by removing the voltage. 1:39-43. At the time of the patent, the liquid crystal response time to change from black to white was typically 20-30 ms. 1:30-33. A typical LCD device, however, is refreshed at a frame rate of 60 frames per second, *i.e.*, sixty static images per second, resulting in a frame interval of about 16.7 ms. Consequently, the typical response time of liquid crystal is longer than one frame interval. 1:26-38. This difference is of particular concern with moving images.

Prior to the '160 patent, various approaches were used to compensate for the slower liquid crystal response time. These included overdriving technology and use of a table memory, containing image increase/decrease values. 1:46-2:12. Thus, the prior art provides for adding and subtracting values to improve response changes due to changes in the gray scale in the liquid crystal panel, and identified the amount to be added or subtracted as the "optimum" amount. 2:4-12 referencing JP 7-56532.

The purpose of the '160 patent is to predetermine offset (*i.e.*, addition/subtraction) values to achieve a specific objective, the output of an ideal quantity of light, taking into account the actual response time of the liquid crystal material. 4:42-47; 5:15-21; 5:66-6:06; 9:01-25; Figs. 4,

6; Abstract. The ideal quantity of light is the amount of light emitted from a display with ideal response time (*i.e.*, response time = 0 ms). 4:42-47, Fig. 4. The '160 patent implements this concept by storing the previous brightness level in a memory and applying an offset to a next brightness level, the offset being predetermined based on the difference between the ideal and actual response characteristics with respect to the previous and next brightness level. 6:11-27.

1. *"so as to make a time integration quantity of a brightness change substantially equal to an ideal quantity of light in a stationary state with respect to the next brightness level"* (claim 1)

LGD's construction of this term is consistent with the specifications in that the result of the "invention" is to achieve a brightness output that is substantially equal to an LCD device with an ideal response (*i.e.*, response time = 0 ms). Indeed, to achieve the purpose of the invention, the result must be so that the quantity of light based on the actual response characteristic is substantially equal to the quantity of light based on the ideal response characteristic. AUO's construction merely restates the term as is and adds a proposed construction for only "next brightness level." By doing so, AUO offers no insight at all into the meaning of this term.

LGD's construction accurately construes this term and is consistent with the patent's own definitions. It is well established that "[t]he specification acts as a dictionary 'when it expressly defines terms used in the claims or when it defines terms by implication.'" *Bell Atl. Network Servs., Inc. v. Covad Commc'ns. Group, Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001) (quoting *Vitronics*, 90 F.3d at 1582). The '160 patent defines "a brightness change" as a "response characteristic depending on the types of liquid crystal cells." 4:50-56. The patent further defines "time integration quantity" as "a change in brightness in the moving-state video signal" and "moving state brightness" as "the brightness when the particular pixel changes back to the off state one frame after it is driven from the off state to the on state during the passage of the wire-

frame model over the particular pixel." 5:16-22, 5:66-6:03. In other words, the "moving state brightness" indicates that there is a change in brightness between the previous video signal and the next video signal for a given liquid crystal cell. Thus, the "time integration quantity of a brightness change" is the quantity of light of the actual response characteristics of the liquid crystal cell when the liquid crystal cell is provided with a voltage level corresponding to the previous brightness level of "off state" to a voltage level corresponding to the next brightness level to a voltage level corresponding to the previous brightness level of "off state" in sequence[9]. 4:43-47, Figs. 5-6.

Concerning the term "substantially equal," LGD maintains that that term is either indefinite or should mean exactly what the specification says the term means. The specification defines "substantially equal level" to be "a level which is not completely the same but can be accepted as a substantially equivalent level, and includes a level which is closer to an ideal quantity of light than no preventive measures are taken." 5:56-60. This definition is so broad, however, that the scope of claim 1 covers what is disclaimed with respect to JP 7-56532. 2:4-12 ("amount to be added or subtracted is expressed only by the word "optimum" and no specific amount is disclosed"). Accordingly, LGD asserts that the term "substantially equal" is either

[9] To the extent claim 1 covers a change in brightness from one medium brightness level to another, the specification is unclear about which voltage level should be applied to the liquid crystal cell after applying the voltage corresponding to the next brightness level between the voltage level corresponding to the previous brightness level or the voltage level corresponding to the "off-state" when determining the "time integration quantity of a brightness change". Depending on the voltage level at issue, the amount of "time integration quantity of a brightness change" would be different, because the falling response time of liquid crystal is different depending on voltage difference. Accordingly, LGD maintains that the term "time integration quantity of a brightness change" is indefinite.

indefinite or means exactly what the specification says it means and not the shortened version suggested by AUO.

2. *"determinator for determining an output brightness level"* (claim 1)

As construed by LGD, determining an output brightness level requires applying a predetermined offset to the next brightness level. The specification clearly states that "the determinator is characterized by comprising a table for storing a brightness level *determined by* the characteristic of a liquid crystal cell according to a relation between the previous brightness level and the next brightness level, and determining an output brightness level by modifying the next brightness level based on the brightness level read from the table." 4:61-67 (emphasis added).[10] The "brightness level" refers to an offset value that is predetermined based on a difference in quantity of light between the actual and ideal response characteristics of the liquid crystal cell. 4:42-47; 5:15-21; 5:66-6:06; 9:01-25; Figs. 4, 6; Abstract; *see also*, 5:31-39, 6:11-27 (the invention, and considered with respect to a display and a driving method, applies an offset to achieve an ideal light quantity). Further, the patent describes that "a wire-frame model is drawn with an adequate gray scale by taking account of a *required offset*, which can be read from the graph shown in FIG. 2, during the movement of the wire-frame model." 9:04-07 (emphasis added). The Court should give substantial weight to such statements that describe the invention as a whole. *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1308

[10] Significantly, a substantial portion of the "Detailed Description of the Invention" in the patent (4:42-6:47) was also in the "Means for Solving the Problem" section of JP 2001-202051A to which the '160 patent claims priority. Thus, those descriptions should have the same legal significance as the "Summary of the Invention" section with respect to the public notice function of patents enunciated by *Phillips*, 415 F.3d at 1319.

(Fed. Cir. 2007); *see also Honeywell Int'l., Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1318 (Fed. Cir. 2006) (noting four references to "this invention'" or "'the present invention'").

In addition, during prosecution, the applicant made clear that applying an offset, which is predetermined by taking into account the response characteristics of the liquid crystal cell, is prerequisite "so as to make a time integration quantity of a brightness change substantially equal to an ideal quantity of light." JX M-1. (App. 09/760,131; 12/22/2003, Appeal Brief).[11] The requirement of applying a predetermined offset is further evidenced by the fact that all the disclosed embodiments are "configured to *store offsets in table form* based on the relation between a brightness level in a stationary state and that in a moving state in order to obtain an ideal quantity of light." 10:49-52, and Fig. 1, 7 (emphasis added). AUO's construction disregards the specification completely by failing to acknowledge that the offset must be a predetermined value.

3. *"brightness level"* (claim 1)

The brightness level of the video signal input from an external video source is modulated and transmitted to an LCD device. In other words, "brightness level" is carried by an electrical signal and modulated by electrical circuits or logic such as the interface board 20 in Figure 1 of

[11] *See also* JX M-1; App. 09/760,131, 12/22/2003, Appeal Brief at 2-3 stating that the "Appellants' invention changes the driving voltages to a pixel to compensate for the slow and/or asymmetrical response of the pixels in a liquid crystal display. It does so **by applying an offset**… (emphasis added)," and continuously stating that "[b]y **taking into account the response characteristics** of the liquid crystal display, as illustrated in Fig. 2, and storing offset values in the Table of Fig. 7, the driving voltage for a pixel is adjusted so that the proper brightness is perceived by the viewer (emphasis added)." Further to overcome a cited reference (U.S. Patent No. 6,333,727) the Appeal Brief at p. 6 also states that "Appellants' invention, as specifically set forth in the claims discussed below, **always uses an offset** to compensate for the slow response time of the liquid crystal display… (emphasis added). The Court should therefore

(Footnote cont'd on next page.)

the '160 patent. Video sources such as televisions and computers transmit two types of color video signals: RGB or YUV data. The "RGB system" uses red, green, and blue color signals, and the "YUV" system uses two signals of UV for chromaticity information and a single signal of Y for brightness information. The "RGB" system uses gray scale values for brightness information, and the "YUV" system uses luminance values for brightness information. In either case, a voltage level represents the brightness level of the signal. Accordingly, LGD asserts that "brightness level" means gray scale value or luminance value because those forms are the ones that are carried and modulated by electronic circuits or logic for displaying images. *See also* 10:57; Fig. 8 (describing brightness level as gray scale value). Furthermore, the video signal carries a gray scale value or luminance value from a predetermined range, not an arbitrary level. As described in the '160 patent, brightness levels are based on the difference between the ideal and actual response characteristics of a given liquid crystal cell. 4:42-47; 5:15-21; 5:66-6:06; 9:01-25; Figs. 4, 6; Abstract. AUO's construction of brightness level as "level of intensity of light" is indefinite and not tied to the use of the term in this context, and offers no guidance at all in understanding the scope of the claims.

4. *"a storage for storing the previous brightness level of the video signal input through said input logic"* (claim 1)

LGD asserts that "storage" is a memory that holds the previous brightness level of the video signal received from the host through input logic. According to the language of claim 1, the previous brightness level is that received from the host through input logic during the

(Footnote cont'd from previous page.)

consider "whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be." *Phillips*, 415 F.3d at 1317.

previous frame time, the next brightness level is that received from the host through input logic during the next frame time. The claims "themselves provide substantial guidance as to the meaning of particular claim terms." *Phillips*, 415 F.3d at 1314. LGD's construction of these terms reflects the understanding of one skilled in the art and is consistent with the disclosure in the patent. 4:61-5:06; 5:30-38; 6:11-27; 9:26-39; 10:57-67; Figs. 1, 7.

On the other hand, the term "frame buffer" in claim 12 should be construed differently from the definition of "storage" in claim 1. First, the word "frame" has a unique and distinct meaning in the LCD industry, and the patent defines it as representing "the scanning of all the images (picture elements) that should form one complete picture on the display." 1:43-45. Thus, the term "frame buffer" in claim 12 should be construed to be "a memory circuit or device that temporarily holds brightness levels for all pixels that form one complete picture on the liquid crystal display," which is different from the definition of "storage" in claim 1. 10:57-62; Fig. 1.

H. U.S. Patent No. 7,090,506 –the "Touch Screen Connector" patent

The '506 patent seeks to simplify connections to a touch screen LCD module by joining multiple flexible printed circuit boards together so that each communicates to a control system through a single common connector. Touch screen LCD modules have several components including an LCD panel, a touch panel, and a light source that each require control signals from the system. An example of a module where each component separately connects to the system is shown in Figure 1 of the patent, reproduced here. As can be seen in the figure, three flexible printed circuit boards 102, 104, and 106 are connected to the control system by three separate connectors. 1:12-21. Figure 2 of the patent modifies this structure by simply joining the

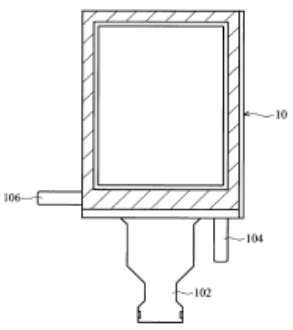


FIG. 1 (RELATED ART)

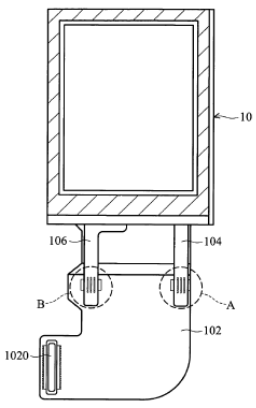


FIG. 2

second and third flexible printed circuit boards directly to the first flexible printed circuit board using a "hot bar soldering" process or "anisotropic conductive film (ACF) bonding" so that only one connector 1020 is needed for the touch screen module.

1. "*flexible printed circuit board*" (claims 1, 9, and 17)

Several terms to be construed include the same disputed issue. Claim 1 recites:

> *a first flexible printed circuit board*, electrically connecting the display module and the system and *a second flexible printed circuit board*, electrically connecting the display module and the first flexible printed circuit board, wherein *the first and second flexible printed circuit boards are joined* by hot bar soldering.

(emphasis added.) There is no dispute that flexible printed circuit boards are made on a flexible film. *See* D.I. 376 at Ex. O-1. The dispute is whether the "flexible printed circuit board" is *entirely* a flexible film with conductive patterns printed on its surface. Read in context of the intrinsic record, the flexible printed circuit board must consist entirely of a single flexible film with conductive patterns printed on its surface, as opposed to allowing the printed circuit to be only *partly* on the flexible film. The language of claim 1 makes clear that the first flexible film is directly attached to the second flexible film by a hot bar soldering process. Consequently, LGD proposes that the flexible printed circuit board is "a flexible film with conductive patterns printed on its surface."

All of the figures and embodiments disclosed in the specification of the '506 patent describe the "flexible printed circuit boards" as entirely made of flexible film and directly attached to each other. *See* Figs. 2-4b, elements (102) and (104). For example, Figs. 2 and 3a of the '506 patent, reproduced here, show that the first and

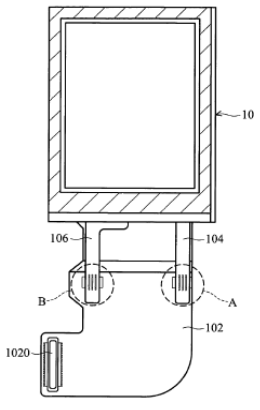


FIG. 2

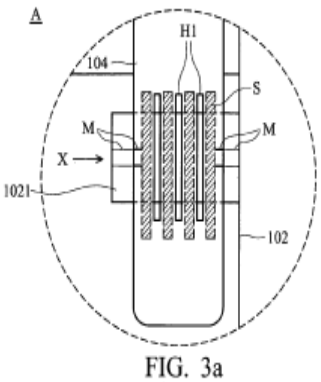


FIG. 3a

second flexible printed circuit boards (102) and (104) are made entirely on flexible films that are attached directly to each other to electrically connect the module to the system using a single connecting port (102). 1:61-2:5. During prosecution, moreover, AUO distinguished this invention from USP 5,684,550 to Shibata et al. ("Shibata"), stating:

> In Shibata, the drive circuit substrates PCB1 and PCB2 are flexibly connected by the foldable flat cable FC, namely, they are not directly '*joined by hot bar soldering*' or joined by anisotropic conductive film (ACF) bonding . . . . In addition, Applicant notes that the flat cable FC in Shibata's patent is neither a flexible printed circuit board . . . . Moreover, the drive circuit substrates in Shibata's patent are not 'flexible printed circuit boards' . . ."

JX 0-1 (App. 10/921,462, 05/10/06 Amendment, p.10 (emphasis in original)).

As AUO confirmed during prosecution, the flexible printed circuit board does not include a foldable flat cable FC or *any* "printed circuit board" (e.g., a rigid or flex-rigid board). Rather, the printed circuit boards must be *flexible*. A printed circuit that is entirely on a flexible film is the proper construction, as the claims, specification, and intrinsic record all disclose a flexible printed circuit board made entirely on flexible film. The flexible circuit boards must also be *directly* joined to each other and not joined indirectly, such as through a foldable flat cable FC.

Accordingly, the Court should construe "a second flexible printed circuit board, electrically connecting the display module and the first printed circuit board" to mean "a second flexible film with conductive patterns printed on its surface that electrically connects the display module and the first flexible film."

2. *"the first and second flexible printed circuit boards are joined by hot bar soldering"* (claim 1)

The claim clearly recites that the flexible printed circuit boards must be joined by a specific process -- hot bar soldering. This is a specific type of soldering and is not the same as standard soldering. One of skill in the art would understand that hot bar soldering solders

multiple points simultaneously while pressure is applied to the parts being soldered. The specification and prosecution history, moreover, repeatedly recite "hot bar soldering" the flexible printed circuit boards to each other and not simply "soldering" them together. 1:32-4; 2:16-8, 64-6; Abstract, Figs. 3a-b. Furthermore, during prosecution, AUO made "hot bar soldering" a distinguishing feature of the invention over Shibata. JX 0-1 (App. 10/921,462, 05/10/06 Amendment, p. 10). Consequently, the term means "both flexible printed circuit boards are connected to each other by a soldering process where the circuit boards are heated with a bar to melt the solder at multiple points simultaneously along each circuit board while pressure is applied to the connection." AUO's proposed construction broadly refers to a "contact area" that is heated with a bar, which might arguably be interpreted to include standard soldering. Thus, LGD's proposed construction should be adopted.

IV. PROPOSED CONSTRUCTION OF CLAIM TERMS OF THE CMO PATENTS

A. U.S. Patent No. 6,734,926 –the "Side Circuit Board" patent

The '926 patent describes an LCD apparatus that achieves a reduced thickness by installing circuit boards on side portions of certain frame-like structures, as opposed to on the back of the backlight unit. The sides of the frame-like structures (*e.g.*, supporting plate, reflecting plate, and supporting frame) are positioned to house and protect the circuit board within the LCD. 8:4-27. The '926 patent seeks to avoid problems of increased display thickness realized by conventional LCDs with control circuit boards installed on the back of the backlight unit. In addition to a slimmer display product, by relocating the circuit boards, the claimed invention purportedly reduces production cost. 3:18-24.

1. ***"a circuit board installed within the gap for controlling operations of the display apparatus"*** **(claim 1)**

The Court should adopt LGD's construction: "a control circuit board is mounted in the

space bounded by the sub-frame and the side portion and no control circuit board is located on the back of the supporting plate or reflecting plate."[12] Read in context, the control circuit board must be located within the display apparatus such that *no control circuit board* can be located on the back of the backlight unit.

The display product has a reduced thickness by housing the control circuit board within the LCD so that no circuit board is located on the back of the supporting plate or reflecting plate of the backlight unit. *See* Abstract, 3:18-22; 8:4-16. Each independent claim recites a specific location within the display for the control circuit board to be housed and should be similarly construed. 8:52-53; 9:24-25 (claims 1 and 8: "a circuit board installed within the gap for controlling operations of the display apparatus."); 9:58-60 (claim 15: "a circuit board installed on the side portion of the reflecting plate for controlling operations of the display apparatus"); 10:27-29 (claim 22: "a circuit board installed on the side portion of the supporting plate for controlling operations of the display apparatus").

CMO clearly disavowed any coverage of a display apparatus having a control circuit board device positioned on the back side of the supporting plate or reflecting plate. The specification repeatedly describes that no control circuit board is located on the back of the reflecting plate or supporting plate. 4:62-64; 6:25-27; 63-65 (i.e., "without any circuit board is installed on the back side of the reflecting plate, the thickness of the LCD apparatus is reduced").

[12] Likewise, disputed term (i) "a circuit board installed on the side portion of the reflecting plate for controlling operations of the display apparatus" (claim 15) means "a control circuit board is mounted to the side of the reflecting plate and no control circuit board is located on the back of the supporting plate or reflecting plate," and (ii) "a circuit board installed on the side portion of the supporting plate for controlling operations of the display apparatus" (claim 22) means "a control circuit board is mounted to the side of the supporting plate and no control circuit board is located on the back of the supporting plate or reflecting plate," as set forth in Exhibit 24.

The scope of the invention is thus limited because the specification describes the lack of any circuit board on the back side of the reflecting plate or supporting plate as a feature of the "present invention" as a whole. *Verizon Servs. Corp.*, 503 F.3d at 1308 ("[w]hen a patent thus describes the features of the 'present invention' as a whole, this description limits the scope of the invention."). The specification describes:

> Compared with the prior art direct-type LCD apparatus, the *present invention* utilizes the space between the side . . . to house the circuit board and related elements. As a result, the thickness of the direct-type LCD apparatus is reduced *without the circuit board and related elements positioned at the back of the LCD apparatus.*

8:5-16 (emphasis added). The specification further describes that "[i]t is an advantage of the *claimed invention*, in which no circuit board is installed on the back side of the direct-type backlight unit, such that the display apparatus has a simplified frame structure and is therefore slimmer and more convenient to use." 4:18-22 (emphasis added). Moreover, in each of the embodiments and figures, no control circuit board is located on the back side of the supporting or reflecting plate of the display apparatus. Figs. 4-13. If any of the claims are construed to allow for a control circuit board to be located on the back side of the supporting plate or reflecting plate of the backlight unit, the primary objective of the invention sought to be protected would be lost. The thickness of the apparatus would not be reduced over the prior art. 2:8-11; 14-6.

CMO's construction for this term, and all related terms, ignores the objective of the "invention" by disregarding an explicit limitation and impermissibly broadening the patent scope to a display apparatus with a control circuit board positioned on the back of the supporting plate or reflecting plate. The Court should therefore adopt LGD's construction.

2. *"a circuit board is installed on the side portion of the reflecting plate for controlling operations of the display apparatus"* (claim 15)

The Court should adopt LGD's construction: "a control circuit board is mounted to the

side of the reflecting plate and no control circuit board is located on the back of the supporting plate or reflecting plate." The primary issue is whether the circuit board must be mounted to the side of the reflecting plate, as LGD contends, or can be attached to some other unspecified structure that is "mechanically supported by" the side of the reflecting plate, as CMO contends. The claim language makes clear that the circuit board is attached to the side portion of the reflecting plate and not some other structure. 9:57-60. Likewise, the specification discloses that the circuit board is "attached to at least one side-portion of the reflecting plate and installed within the gap between the side portion of the reflecting plate and the lower frame." 2:61-65; 6:25-27 ("the circuit board 112 and connector 114 are installed onto the side portion 118 of the reflecting plate"). Moreover, relevant Figures 8 and 9 show the control circuit board mounted directly to the side portion of the reflecting plate and not some other structure. CMO's "mechanically supported by" construction is ambiguous and inconsistent with the claims and specification.

3. *"being separated from the side portion by a gap"* (claims 1 and 9)

The main issue concerns how the gap is construed. The gap is a space that is bounded by the sub-frame and side portion and formed based on the position of the supporting frame with respect to the reflecting plate. The Merriam-Webster's Dictionary defines "gap" as "a separation in space." Ex. L-27(a) (Merriam-Webster Dictionary (1994) at p. ___). This separation in space is formed based on the position of the supporting frame with respect to the reflecting plate. 8:46-51. Thus, the space must be bound by these structures. Moreover, all of the figures show that the gap is a space bounded inside the sub-frame and outside the side portion that houses a circuit board. Figs. 4-7. Consequently, LGD's construction "positioned to form a space bounded by a sub-frame and a side portion" should be adopted. CMO's construction is ambiguous and could

lead to a nonsensical result.

B. U.S. Patent No. 6,134,092 – the "LED and Reflector Backlight" patent

The '092 patent describes an illumination device that uses point light sources, such as light emitting diodes ("LEDs"), and reflectors to direct light into a waveguide to provide a uniform illumination for the display. The supposed problem with the prior art edge light LED illumination devices was that the intensity of the light from the LEDs decreased as the distance from the LEDs increased, thereby causing undesirable bright spots along the periphery of the display where the LEDs are mounted. 1:19-23. The claimed invention adds diffusive reflective guide members between each of the LEDs. These guide members are positioned upright and oriented to reflect and scatter light received from the LEDs to the waveguide. Figs. 11, 13, and 13A. Consequently, the periphery of the waveguide is substantially uniformly illuminated which allows for a bright, uniform illumination for the display. 1:35-39; 41-52.

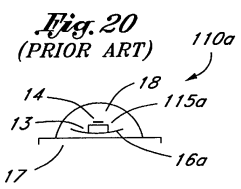
1. "*a series of point light sources*" (claims 1, 12, 17, 21 and 26)

The Court should adopt LGD's construction: "a sequence of separate components, such as light-emitting diodes, that provide the desired light that illuminates the waveguide or optical cavity." The primary issue concerns an understanding of LEDs as a point light source. Read in the context of the claims, specification, and prosecution history, the claimed point light source, if an LED, must be the packaged LED structure and not simply a portion of the structure, known as the semiconductor die. First, the claim language requires that the point light sources emit the light that is introduced into the waveguide or optical cavity, *i.e.*, the desired light. 9:36-43, 10:33-6. For liquid crystal displays, the desired light is typically white light that can be provided by separate red, green and blue LEDs or by white LEDs. The semiconductor dies of white LEDs, however, do not emit white light. Instead, they typically emit blue light that combines

with yellow light produced by a yellow phosphor coating to create the desired white light. Thus, for example, to the extent a point light source is a white LED, it must include the entire LED, *i.e.*, the structure containing the semiconductor die and the phosphor coating, to provide the desired light introduced into the waveguide.

The patent specification and prosecution history support LGD's construction. All of the figures show the LED point light source as a packaged LED component and not simply the semiconductor die portion of an LED. Figs. 2, 11, 13 and 13A. Moreover, the prosecution history only discloses LED point light sources as packaged LED semiconductor dies. Further, for all of the prior art references that the Examiner determined disclosed "a series of point light sources", those light sources were packaged LEDs, not simply the semiconductor dies. JX V-1 (App. 09/057,199, 3/23/00 Notice of Allowability, pp. 4-5 (citing USP 3,892,959 to Pulles and USP 5,365,411 to Rycroft et al.)).

Significantly, inventors Pelka and Popovich are named inventors on a similar patent, USP 6,473,554, that discloses LED light sources. This patent is instructive to understanding what the inventors considered to be an LED point light source around the time of the invention. In this patent, the inventors described LED (110a), disclosed in Fig. 20 of the '554 patent, reproduced here, as a "conventional prior art 'bare' light emitting diode." '554 Patent, 15:14-39. The LED (110a) is a packaged LED and is almost identical to the LED point light source (50) shown in cut-out portion Fig. 13A of the '092 patent, reproduced here. See Figs. 11, 13, and 13A. The inventors' understanding disclosed in the '554 patent is consistent with LGD's construction that the point light source is not just a semiconductor die portion within an LED.



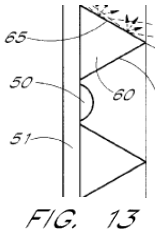


FIG. 13

2. *"diffusive reflective surfaces"* (claims 1, 12, 21, and 26)

LGD proposes that "diffusive reflective surfaces" are "non-transparent boundaries of an object that reflect and scatter light from the point light source." The difference between the parties' constructions is that LGD's construction describes what is meant by the words "diffusively reflect" while CMO's construction does not. The surfaces that diffusively reflect must be non-transparent so that they can reflect and scatter light. LGD's construction adopts a plain meaning for "diffusive," which is "scatter." Ex. L-29(a) (Merriam-Webster Dictionary (1994)) ("diffuse" means "2. to break up and distribute (incident light) by reflection."). CMO's use of "diffusively reflect" in its construction offers no guidance as to the meaning of this term. Accordingly, the Court should adopt LGD's construction because it is consistent with the intrinsic record. 1:44-52.

3. *"oriented relative to the series of point light sources and the waveguide so as to introduce light"* (claim 1)

LGD's construction for this term "arranged to be substantially perpendicular to the top surface of the waveguide so as to introduce scattered light directly from the point light sources into the waveguide" should be adopted because it clearly describes the orientation of the diffusive reflective surfaces. Read in context of the claims and specification, the diffusive reflective surfaces must be arranged upward relative to the top surface of the waveguide in order to introduce scattered light into the waveguide. 1:44-52. Although CMO's construction vaguely states that the "diffusive reflective surfaces are angled relative to each other," CMO construes "diffusive reflective surfaces" as "including a surface that extends upward relative to a planar surface." *See* D.I. 376 at Ex. U-2. CMO thus recognizes that the diffusive reflective surfaces be arranged upward relative to the top surface of the waveguide.

4. *"diffusive reflective optical cavities"* (claims 12 and 17)

"Diffusive reflective optical cavities" are "optical passages having non-transparent surfaces that reflect and scatter light from the point light source." LGD's construction describes how the optical cavities diffusively reflect light received from the point light sources, while CMO's construction simply refers to the "cavities" as spaces and offers no context relative to the claimed invention. LGD's construction best explains the meaning of the term in the context of the claims and specification. 1:61-65; 2:1-9. Accordingly, LGD's construction should be adopted.

5. *"guide members positioned along a periphery of the optical cavity"* (claim 21)

Read in context of the claims and specification, LGD contends that each guide member is a separate structure that is unattached from another guide member. The claim language recites that the guide members are positioned so that "spaces are defined between each of the guide members." 10:51-53. This plainly requires that the guide members are separate and unattached structures from each other because between each guide member, there is a space. The specification supports this construction, disclosing that "a plurality of guide members 60 are disposed in a spaced, side-by-side relationship." 3:42-44. Moreover, all of the figures show the guide members as separate, unattached structures. Figs. 3, 4, 11, 13, and 13A. CMO's proposed construction is ambiguous because it does not construe the words "guide member," making it unclear whether each guide member must be separate and unattached from another, as required by the patent. Only LGD's construction of "separate structures, unattached from one another, each adjacent a side edge of the optical cavity" is consistent with the disclosure of the '092 patent and, therefore, should be adopted.

C. U.S. Patent No. 6,013,923 – the "ESD Protection and Testing" patent

The '923 patent describes that electrostatic discharge can occur during manufacturing and during testing. 3:10-14. Methods for protecting against electrostatic discharge, such as through inner guard rings that remain on the display, outer guard rings, or a combination of both (see LGD's '002 patent, discussed *supra*) had been known for many years before the '923 patent. The '923 describes an approach to providing ESD protection that allows for testing wherein all the gate lines and all the source lines are connected through a direct connection on one end and through a protection element on the other end to one of two shorting elements that are formed at the same time as the gate lines or source lines. The direct connection of the gate lines to a shorting element protects from electrostatic discharge during the first stage of manufacturing. The connections through the protection element, which remain after the direct connection is removed, protect against electrostatic discharge during later stages such as testing.

1. "*during formation of said gate lines*" and "*during formation of said source lines*" (claim 1)

LGD's proposed construction "at the same time when the electrically conductive material that forms the gate lines is deposited and etched" and "at the same time when the electrically conductive material that forms the source lines is deposited and etched" should be adopted. The primary dispute hinges on whether this term is limited to only the manufacturing stage when the gate lines are formed, *e.g.*, when the gate layer is deposited and patterned by etching. Formation refers to the depositing and etching of a layer. Thus, forming of the gate lines would specifically be the depositing and etching of the gate metal layer. Forming the source lines involves the separate and distinct steps of depositing and etching of the source metal layer. The additional steps in between, as shown in Fig. 4, such as depositing a gate insulating layer and depositing and etching the semiconductor layer, would not be included in the step of forming the gate lines

or the step of forming the source lines.

By asserting that "during formation of said gate lines" include the stages in which the gate lines are connected, CMO hopes to encompass all the manufacturing steps up to and including source line formation and patterning of pixel electrodes. The same fault exists with CMO's construction related to "during formation of said source lines." By broadening the claim language in such a manner, CMO disregards the "during formation of said gate lines" and "during formation of said source lines" limitations. Thus, with CMO's construction, there would be no distinction between during gate line formation and during source line formation. 1:58-64; 5:55-57; Fig. 4.

The specification unequivocally discloses that the formation of the gate lines and the formation of the source lines are separate and distinct manufacturing steps. They cannot be construed to be the same. 6:14-18 (one shorting element "is formed when the gate lines (24) are being formed" while the second shorting element "is formed when the source lines (26) are being formed"); 3:16-19 (specifically discussing isolating the gate lines before finishing the source line metallization). Accordingly, CMO's effort to combine the two separate manufacturing steps into one should be rejected.

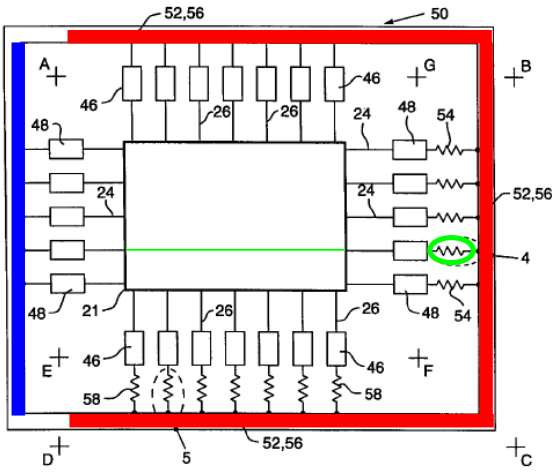
2. "*shorting element*" (claim 1)

LGD's construction "a pattern of conductive material for electrically connecting, with low resistances, the gate lines to each other or the source lines to each other" should be adopted. LGD's construction is consistent with the claims and specification. Read as one of ordinary skill would understand the claims, the term shorting refers to a short. A short circuit is defined as "a connection of comparatively low resistance accidentally or intentionally made between points on a circuit between which the resistance is normally much greater." Ex. L-31(a) (Merriam-

Webster (1994)). Hence, a shorting element must provide a connection of low resistance, thus requiring the element be conductive. Moreover, the claim language and specification consistently require that each shorting element be connected to all the gates lines or all the source lines. 5:42-52; 7:1-17.

3. *"electrically coupling said shorting elements"* (claim 1)

LGD's construction "electrically connecting the shorting element without intervening protection elements" properly addresses the primary dispute -- whether intervening protection elements must be excluded. A detailed review of the claims fully supports LGD's construction. As required by claim 2, a first shorting element connects both ends of the source lines and one end of the gate lines, and a second shorting element connects to the other end of the gate lines. As shown in annotated Fig 3, this structure results in one shorting element in a backwards C-shape highlighted in red, and the second shorting element as a single line. These first two elements of claim 2 make clear that the two shorting elements are already electrically connected through a protection element, highlighted in green, prior to the electrically coupling step. Thus, electrically coupling cannot include electrically connecting through protection elements or the limitation would be meaningless.



The specification is also consistent with LGD's construction, as it only discloses electrically connecting through vias, *i.e.*, directly connecting one metal layer to another. 5:57-59; 6:7-9; 7:18-21. The intrinsic record does not suggest that electrically coupling said shorting element should include connecting with protection elements. Accordingly, LGD's construction

should be adopted.

4. *"protection element"* (claim 1)

LGD's proposed construction "a circuit component designed to protect against electrostatic discharge and to allow for testing" should be adopted. The specification repeatedly refers to providing protection from electrostatic discharge throughout the entire manufacturing process, including testing. 4:27-32; 5:33-41; *see also* 6:25-36 (even after the direct connections of the gate and source lines are removed, the remaining connection though protection elements will quickly disperse through the protection elements, any charge that arises during testing of the array). CMO's proposed construction fails to achieve the fundamental goal of the patent to provide protection throughout the entire manufacturing process including testing and wire bonding. As defined by CMO, a protection element could cover any element, such as shorts between the gate and source lines. Further, CMO's construction would blur any distinction between a direct connection and a connection via a protection element.

D. <u>U.S. Patent No. 5,619,352 –the "O-Plate Compensator" patent</u>

The '352 patent describes "techniques for maximizing the field of view of [liquid crystal] displays by maintaining a high contrast ratio and minimal variance in relative gray levels over a wide range of viewing angles." 1:15-23. The parent of the '352 patent, U.S. Patent No. 5,504,603 ("the '603 patent"), also addresses ways to improve gray scale stability, using an O-plate compensator with a positive birefringent material. The '352 patent describes how the O-plate compensator with a positive birefringent material disclosed in the '603 patent compensates for the gray-level states of LC molecules. 7:07-23; Figures 6-7 (without O-plate compensation), Figures 9-10 (with O-plate compensation).

Both the '352 and '603 patents use O-plate compensators to improve viewing angle

dependency of liquid crystal at gray-level states. Whereas the O-plate compensator in the '603 patent has a fixed oblique tilt angle, the compensator of the '352 patent has continuously varying tilt and/or twist angles. 10:49-11:31; Abstract. According to the '352 patent, because the LC molecules at gray-level states are significantly splayed and twisted yielding biaxial character, the O-plate compensator with continuously varying twist and/or tilt angles ("twisted/splayed O-plate") more closely approximate the LC molecules at gray-level states over the O-plate compensator disclosed in the '603 patent. 9:37-10:47, 10:49-11:31; Abstract. The goal of the '352 patent was to manufacture a twisted/splayed O-plate with a positive birefrigent material that can duplicate the performance of existing biaxial inorganic O-plate compensators at reduced cost and increased design flexibility. 10:27-59.

1. *"a layer of a birefringent material"* (claim 3)

In accordance with the disclosure in the specification and arguments during prosecution, this term means "a thickness of material including positively birefringent molecules that are uniaxial or near uniaxial in character." Claim 3 recites:

> A compensator for a liquid crystal display, said compensator comprising *a layer of a birefringent material* having an *optical symmetry axis* defined by a tilt angle, measured relative to the plane of the layer, and an azimuthal angle, measured relative to a reference axis in the plane of the layer, wherein *said tilt angle varies along an axis normal to said layer*, and said azimuthal angle is substantially fixed along an axis normal to said layer.

(emphasis added.) Both the specification and prosecution history make clear that the layer of birefringent material is positively birefringent. JX R-1. The scope of the '352 patent is limited to a compensator with a positively birefringent layer. The specification limits the scope of the invention by describing the "invention" as a whole as: "[t]he *compensator design of this invention*, which includes a *positively birefringent* twisted and/or splayed O-plate layer, makes possible a significant improvement in the gray scale properties and contrast ratios of liquid

crystal displays (LCDs) over a wide range of viewing angles." 10:51-55 (emphasis added). The Federal Circuit has made clear that statements that describe the "invention" limit the scope of the invention to what is described. *Verizon*, 503 F.3d at 1308 ("When a patent thus describes the features of the 'present invention' as a whole, this description limits the scope of the invention."); *see also SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343 (Fed. Cir. 2001) (noting description in the "Summary of the Invention"); *Honeywell*, 452 F.3d at 1318.

LGD's construction is also consistent with the prosecution history of the parent '603 patent, which, likewise, is directed to an O-plate compensator with birefringent material. During prosecution of the '603 patent, the patentee stated that the O-plate compensator is *always* positively birefringent. JX R-1 (8/23/95 Amendment at p. 7 (emphasis added).) Because the subject matter of this statement is directed to the property of the material and is common to both the '352 and '603 patents, the patentee's statement in the August 23, 1995 Amendment further confirms that the "birefringent material" claimed in the '352 Patent is "always" positively birefringent. *See Wang Labs., Inc. v. America Online, Inc.*, 197 F.3d 1377, 1384 (Fed Cir. 1999) (relying on statement made when prosecuting parent application in construing continuation-in-part) (citing *Jonsson v. Stanley Works*, 903 F.2d 812, 818 (Fed. Cir. 1990)).

Further, the patentee stated during prosecution of the '603 Patent that a negative birefringent compensator has a *detrimental effect* on gray scale in order to overcome U.S. Patent No. 5,196,953, a cited reference. 8/23/95 Amendment at p. 9. The '352 and '603 patents use an O-plate compensator to address viewing angle dependency of gray-level states. *See* 7:07-23; Abstract. The patentee "stated in a public record what his invention could not be. That statement is a deliberate surrender of claim scope, unmistakable in its effect." *Omega Eng'g, Inc. v. Raytek*

Corp., 334 F.3d 1314, 1327 (Fed. Cir. 2003). CMO cannot now seek a construction that includes a scope previously disclaimed.

The embodiments directed to a compensator, moreover, consistently show positive birefringent constituents. *See* Figures 12, 13 and 14. The rod-like structure of the molecules (or moieties) in these figures show to one skilled in the art that the compensators in the embodiments include positively birefringent material. Also, because the tilt angle of the LC molecule 820 at the center of the LC layer is around 45° toward the upper forward direction, and because the tilt angles of the molecules in Figures 12, 13, and 14 are aligned around 45° toward the lower forward direction, these molecules must be positively birefringent to be consistent with the compensation principle disclosed in the patent. *See* 8:16-53; s*ee also, Alloc, Inc. v. ITC*, 342 F.3d 1361, 1370 (Fed. Cir. 2003) (noting that "all the figures and embodiments disclosed in the asserted patent[] imply" a particular limitation).

In addition, "birefringent material" in the context of the patent claims should be construed to be uniaxial or near uniaxial in character. The '352 Patent states that "[o]n the microscopic scale the film is composed of a polymerized birefringent liquid crystal material which is *uniaxial or near uniaxial in character*." 10:62-64 (emphasis added).

Likewise, the patent confirms that the compensation film should have a "similar or complementary optical symmetry" with the liquid crystal being compensated. "The intuitive approach to compensator development has been that like compensates like, *i.e.*, compensators should have similar or complementary optical symmetries to the liquid crystal layers they are intended to compensate." 10:17-20. The compensator claimed in the Patent is thus uniaxial or near uniaxial, to be complementary to the uniaxial or near uniaxial liquid crystal material to be compensated.

2. *"optical symmetry axis"* (claim 3)

This term means "the extraordinary axis of the molecules." Although the '352 patent states that it generally describes "optical symmetry axis" as the extraordinary axis in uniaxial materials and the principal optic axis in biaxial materials, the scope of claim 3 is limited to uniaxial materials and the extraordinary axis.

3. *"tilt angle varies along an axis normal to said layer"* (claim 3)

In accordance with the specification and prosecution history, this term requires that "the tilt angle of the compensator varies along an axis normal to the layer of birefringent material and is limited to values between approximately 25 degrees and approximately 65 degrees." As required by claim 3, the compensator is a splayed O-plate with a tilt angle that varies along an axis normal to said layer, and an azimuthal (or twist) angle is substantially fixed along an axis normal to the layer. The word "splayed" means that the tilt angles of the constituents vary continuously, as explained in the '352 patent. *See* 10:13-20, 10:67-11:2 ("Within this constraint, the direction of the material's optical symmetry axis is allowed to *vary continuously* along the axis normal to the film surface." (emphasis added). CMO's proposed construction disregards the specification and public notice function of patents.

Furthermore, based on the prosecution history of the '352 and '603 patents, the tilt angle is limited to the range between approximately 25 degrees and approximately 65 degrees. During the prosecution of both patents, the patentee sought to overcome the cited references by adding the limitation of 25 to 65 degrees, despite lack of support in either patent. For example, during prosecution of the '352 patent, the patentee amended claims 1 and 5 to overcome one of the cited references, EP 0423881A1 ("Heynderickx et al.") by respectively adding "said tilt angle limited to values between approximately 25 degrees and approximately 65 degrees" and "and said tilt

angle is substantially fixed at an angle between approximately 25 degrees and approximately 65 degrees, along an axis normal to said layer." JX R-1 (App. 08/690,033, 1/22/1996, Amendment, pp. 9-11). The patentee distinguished "Heynderickx et al." because "a compensator in accordance with any one of claims 5, 6, and 7 has a birefringent layer whose optical axis (either tilt angle, or azimuthal angle, or both) varies. A further distinction between a compensator in accordance with any of claims 5, 6, and 7 and Heynderickx et al. is that the tilt angle is substantially greater than zero; "between approximately 25 degrees and approximately 65 degrees." In a March 5, 1996 Office Action, the Examiner then allowed claims 1, 5, 6, and 7 (now claims 1, 2, 3, and 4 of the '352 patent). Having limited the scope of these claims during prosecution, CMO cannot now seek to broaden the scope of the claims. *See, e.g., Board of Regents v. BenQ America Corp.*, -- F.3d --, 2008 WL 2834704, *5 & *8 (Fed. Cir. July 24, 2008); *Hockerson-Halberstadt, Inc. v. Avia Group Int'l, Inc.*, 222 F.3d 951, 956-57 (Fed. Cir. 2000).

4. *"a desired viewing characteristic over a specified field of view"* (claim 29)

The term "a desired viewing characteristic over a specified field of view" is subjective and does not particularly point out and distinctly claim the subject matter which the applicant regards as his invention. Thus, this term is indefinite under 35 U.S.C. § 112, second paragraph. *See Halliburton Energy Servs. v. M-1 LLC*, 514 F.3d 1244, 1249-50 (Fed. Cir. 2008).

E. U.S. Patent No. 6,008,786 – "Gamma Correction and Delay Circuits" patent

The '786 patent concerns the concept of gamma correction for an LCD device. Gamma correction, a very old technique used in cathode ray tubes, is essentially an encoding technology for video signals. Video signals typically carry brightness information for red, green, and blue colors ("R, G, B colors"). The brightness information for each color is generally represented in

the form of gray-scale levels (or brightness levels) from a predetermined range.

To display an image on an LCD device, voltages corresponding to respective gray-scale levels are provided to each pixel. Because of the characteristics of liquid crystal, the transmission curves for the R, G, B colors are typically different from each other ("wavelength dependency"). If this wavelength dependency is not corrected, the transmission curves for blue are higher than that of both red and green resulting in the picture taking on a bluish hue. 2:1-27.

The patent discusses various prior art gamma correction methods. One of the prior art methods applies reference voltages to the data driver of an LCD device that is tailored to the characteristics for each of the R, G, B colors. The patent refers to JP No. 01-101586 as disclosing "a technique in which different liquid crystal driving voltage levels are set for each of the colors, and that level is applied to each pixel." 3:1-4. According to the patent, however, this method requires circuits for each of the colors to control the voltages, thus increasing cost and difficulties in implementation. 2:46-67.

The patent suggests a gamma correction method in which not all video signals are compensated. In other words, only one or two of the R, G, B video signals are modified, relative to the remaining video signal(s), for gamma correction. Abstract; Summary of the Invention; 5:53-67. In the preferred embodiment, B video signal (or gray scale data) is modified to match the R and G video signals for gamma correction. 3:64-5:52, Figs. 3, 5, 9. To implement this concept for an LCD device, the patent describes "a computing circuit for *performing an addition or subtraction* of the gray scale related to at least one color to generate a corrected gray scale, and also includes delay means for *delaying the outputting of the uncorrected gray scales*, during the time which the gray scale of the one color is being corrected." 3:24-32 (emphasis added).

1. *"changing the level of gray scale data signals for at least one color relative to the other colors to a different gray scale level"*[13] **(claim 1)**

The Court should adopt LGD's construction: "adding or subtracting compensation values to modify the gray scale levels of one or more but not all color video signals." There are two disputed issues -- *how many* of the signals, *e.g.*, RGB, are subject to having their gray scale level changed, and *in what way* are they changed. The language of this limitation makes clear that at least one signal must be changed. The dispute is whether *all* of the signals can be subject to a change. The claims themselves, the specification and the prosecution history make clear that the answer is no. Although this limitation does not recite "but not all," in the context of the claim such must be understood because, as reflected in the claim, a "delay" limitation for uncorrected signals is included (discussed *infra*). Thus, the claim itself reflects that not all of the gray scale data signals are changed. *Phillips*, 415 F.3d at 1314 (claims "themselves provide substantial guidance as to the meaning of particular claim terms").

The specification further emphasizes this. The patent states that "*the present invention… also includes* delay means for delaying the outputting of the *uncorrected* gray scales, during the time which the gray scale of the one color is being corrected." 3:28-31 (emphasis added). Further, the embodiments describe that only blue input gray scale data are corrected, while red and green input gray scale data are not corrected but, instead, are delayed to be synchronized

[13] The terms "changing the level of gray scale data signals related to at least one of the multicolors supplied to the display cell to create a corrected gray scale data signal with a level different from the inputted gray scale data signal" (claim 5) and "calculation logic . . . for changing the level of the gray scale data signals of said at least one color to a different gray scale level" (claim 7) have the same underlying disputes. In addition, the term "changing the gray scale data signals relate to one of the multicolors" (claim 12) includes the issue related to in what way the signals are changed.

with the blue input gray scale data. 5:10-52; Figs. 5, 6, 7, 9. Significantly, the cited prior art discloses correction of all three RGB video signals. 3:1-11. Thus, "the claims should not be read so broadly as to encompass the distinguished prior art structure" where the written description in the patent identifies advantages over the prior art. *SciMed*, 242 F.3d at 1343. Likewise, the prosecution history supports LGD's proposed construction. During prosecution, the patentee distinguished the invention from U.S. Patent No. 5,369,432, stating that "[e]ach of the R, G & B channels in Kennedy is subjected to the same correction. Therefore, there is no need to delay the gray scale data of one relative to another." JX S-1 (App. 08/832,640, 3/23/1999 Amendment, p. 5). Only LGD offers a construction that explains this aspect of the claim limitation.

In addition, LGD's construction explains that compensation values are used to change the levels of gray scale data signals. The patent's Abstract, Summary of the Invention, and claim language all support LGD's proposed constructions. *See also Phillips*, 415 F.3d at 1319 (referencing public notice function of patents). For example, claim 6 recites "wherein said correction includes an adding or subtracting voltage level representations of at least one gray scale of said at least one color" to explain how compensation values are used. Similarly, each of the embodiments of the patent describe that "addition or subtraction amount" of "0" or "-4", stored in the addition and subtraction table, is added to the input gray scale data for blue. 5:11-43 and Figs. 5, 6, 7. Thus, the "addition or subtraction amount" indicates that "changing the level of gray scale data signals" means "adding or subtracting compensation values to modify the gray scale levels." Further, during prosecution, the patentee characterized the invention as including "a computing circuit … for generating corrected gray scale data by performing an *addition or subtraction* of the gray scale level." JX S-1 (App. 08/832,640, 3/23/1999

Amendment, p. 5 (emphasis added)). Thus, all the figures and embodiments of the patent as well as the prosecution history fully support LGD's proposed constructions. *Alloc*, 342 F.3d at 1370 (Fed. Cir. 2003) (noting that "[A]ll the figures and embodiments disclosed in the asserted patent[] imply" a particular limitation); *Phillips*, 415 F.3d at 1317 (prosecution history can "inform the meaning of the claim language by demonstrating how the inventor understood the invention").

2. *"delaying any uncorrected gray scale signal related to the other colors for the time delay caused by said corrected gray scale data signal being corrected"*[14] (claim 1)

LGD's construction "holding or deferring at least one color video signal that is not subjected to a compensation value by the amount of time taken to modify another color video signal" is supported by the specifications, preferred embodiments, and prosecution history. According to the patent and to distinguish over the prior art, not all of the R, G, or B gray scale values are corrected, and thus at least one of the driver circuits does not include calculation logic for adding or subtracting compensation values. 1:27-46; 3:16-32; JX S-1 (App. 08/832,640, 3/23/1999 Amendment, p. 5). Only the color video signals that are corrected would necessarily contain a driver circuit that includes calculation logic. 3:67-4: 6. The gray scale values not corrected, which according to the patent must be at least one of R, G, or B, would have a delay circuit. "A delay circuit delays the gray scale data for uncorrected colors to maintain synchronization between the gray scale signals of all colors." Abstract; JX S-1 (App.

[14] The terms "delaying the output for at least one other of the multicolors by the time taken for correction of said at least one color" (claim 5), "delay logic in the driver circuit for any other of the colors without the calculation logic in its driver circuit for delaying the gray scale signals for the other of the colors" (claim 7), and "delaying the output for any other color of the multicolors

(Footnote cont'd on next page.)

08/832,640, 3/23/1999 Amendment, p. 5).

3. *"driver means," "data control means," "computing means," "buffer means,"* and *"adjusting means"* (claim 1)

Each of these terms are to be interpreted in accordance with 35 U.S.C. § 112, ¶6. *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 950 (Fed. Cir. 2007). LGD's proposed identification of function and disclosed structure that performs the recited function are set forth in D.I. 376 at Ex. S-1, 2, 3, and 4. See also Ex. L-33.

F. U.S. Patent No. 7,280,179 – the "Overlapped Sealant" patent

The '179 patent relates to a method for dispensing sealant material onto a substrate so that uncured sealant does not contaminate the liquid crystal material. The "invention" is described in the specification as a "novel applying method" whereby sealant material is initially deposited at an area outside of the display region so that any excess sealant accumulated in the dispensing device is deposited outside of an overlapping area of the sealant that fully encloses the display region. 4:12-25. CMO itself distinguished this "invention" from the prior art by pointing to the overlapping area of sealant that is formed along one side of the display region. JX W-1 (App. 10/921,508, 3/1/07 Amendment, pages 13-14). As described and shown in Fig. 4 in the patent, this overlapping area extends along the main portion of the sealing member. According to CMO, the difference between the overlapping area and prior art is that the sealant in the prior art overlaps along an area that extends away from the display region so as to leave a space along the side of the display region. *Id.*

(Footnote cont'd from previous page.)

with gray scale data signals not subject to a correction by the amount of time taken for correction of the one color" have the same underlying disputes. See Ex. L-33.

1. *"forming a sealing member having a main portion enclosing a display region"* (claim 1) *and "overlapping area extends along one side of the display region"* (claim 8)

Consistent with the claims, specifications, and prosecution history, LGD contends the overlap extends along a side parallel to the edge of the display region. Claim 1 requires:

> *forming a sealing member having a main portion enclosing a display region* . . . . wherein the sealing member is formed by the following steps: . . . continuing applying the sealing member along the display region to form the main portion of the sealing member, wherein positions of an initial end and an overlapping area within the sealing member are different and the *overlapping area extends along one side of the display region*;

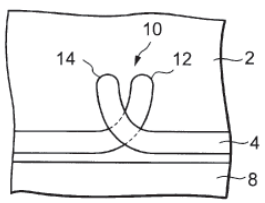
Further, during prosecution of the application, CMO distinguished from a prior art reference based on its disclosure of overlap in a region that was not parallel to the edges of the display. *See Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1343 (Fed. Cir. 2001) (statements made during prosecution may also affect the scope of the claims); *Purdue Pharma L.P. v. Endo Pharms.*, Inc., 438 F.3d 1123, 1136 (Fed. Cir. 2006) ("a patentee may limit the meaning of a claim term by making a clear and unmistakable disavowal of scope during prosecution"). Specifically, CMO distinguished Figure 4 of the Yoshizoe reference, reproduced below, from the claimed invention:

> [Fig. 4] does not teach the feature: "wherein positions of an initial end and an overlapping area within the sealing member are different and *the overlapping area extends along one side of the display region*," as illustrated in FIG. 4 from the present invention below (area 210).

JX W-1 (App. 10/921,508, 3/1/07 Amendment, pages 13-14).

As shown in Fig. 4 of *Yoshizoe*, the overlapping area extends away from the side of the display region, leaving a space below the overlapped sealant and along the side of the display region, as opposed

FIG.4



to extending "along one side of the display region". In order for the overlapping area to extend along one side of the display region, the overlapped sealant must be deposited so that it is parallel to the edge of the display region.

Accordingly, "forming a sealing member having a main portion enclosing a display region" means "depositing sealant material parallel to the edges of the display region so that it encloses the display region", and "overlapping area extends along one side of the display region" means "a segment of the sealing member main portion where sealant material is applied on top of previously applied sealant material along one edge of the display region."

CMO's proposed constructions for these terms are improper because they do not address the limiting statements made during the prosecution to overcome *Yoshizoe*, and would allow the claims to read on Fig. 4 of *Yoshizoe*. *Chimie v. PPG Indus.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) (it is improper for terms to be construed "one way in order to obtain their allowance and in a different way against accused infringers").

CONCLUSION

For the foregoing reasons, LGD requests that the Court adopt LGD's claim constructions.

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